RAILROAD GAZETTE

FRIDAY, NOV. 14.

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Contributions.

A Well-Worked Trick.

New York Car Wheel Works,
BUFFALO, N. Y., Nov. 11, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We note in your issue of Oct. 31 the item of information that the Griffin Car Wheel Works, of Buffalo, contemplate starting a car wheel works in Middlesborough, Ky. While we have no such intentions, and it is hardly necessary for us to correct the matter, still for certain reasons we would like to do so, and would like to have you state that we have never investigated the matter at all, and do not contemplate doing anything of the kind. The practice that people who are interested in developing new localities have been making of late years in making claims of this kind for the furtherance of their own interests is hardly a creditable proceeding. I do not know who compose the Middlesborough Town Company, but they are undoubtedly actuated in this matter by a desire to help along some real estate speculations that they have on hand.

P. H. GRIFFIN, President.

The Sykes Patents.

The Johnson Railroad Signal Company,
RAHWAY, N. J., Nov. 5, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The "Union Switch and Signal Company, by E. H. Goodman, General Manager," in your issue of Oct. 31 states that it purchased the entire right to the Sykes English patents for block signaling from one Yeomans in March, 1882, and it would be pleased if somebody would "tell us how Sykes, or his company, after thus selling his patent to us in 1881, could again sell it to somebody else in 1889 and make a valid transfer."

We will enlighten the General Manager and his company. We only state, what he probably knows already, that his company never obtained any title to the Sykes patents from Sykes directly, and that Yeomans had no power to transfer it. Such is the fact as claimed by the Johnson Railroad Signal Company, and as it fully expects to establish in a suit brought by it against the Union Switch and Signal Company in the United States Circuit Court for that purpose.

The decision of that case, and neither Mr. Goodman's assertion nor the writer's, will settle the question.

CHAS. R. JOHNSON, General Manager.

The M. C. B. Association and the Standard Coupler Lines.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Executive Committee of the Master Car Builders' Association, under the powers granted it at the last convention, has delegated to a Sub-Committee of three, for investigation, the question of lines or contour of the vertical hook coupler. It has been strongly urged upon this Committee to call for a strict conformity to the Master Car Builders' lines in all automatic couplers. In other words, they are requested to restrict and limit the conditions to which inventors are now required to conform their devices. I think you will agree with me that the state of the art is not so far advanced that such action can be safely taken. A study of the question of the lines will show: That a large number (probably exceeding 100) can be designed, on all of which the coupler can be constructed and all meeting the requirements of coupling with the Master Car Builders' lines and each with the others; that the pivotal point of the knuckle or centre on which it turns can be varied through a space of at least 6 sq. in. on the drawhead; that each set of lines has its most advantageous place for this centre point, and that as the point is varied, so an distribution of metal be varied in the drawhead knuckle, pivotal point and locking device. I therefore consider that the adoption of a given set of lines is, in fact, the adoption of a given coupler, leaving open to inventors only the form of locking device.

Would it not be better if the Committee, instead of placing these additional restrictions on inventors, should extend their investigations of this coupler question? The aggregate cost of the present plan of each road experimenting on its own account with various devices must be a very great and even unknown amount, in many cases increased by expensive delays to trains and actual damage to equipment. Could not the Committee take up this question exhaustively on, say, the following lines: Requiring all manufacturers of couplers to send in two or more couplers for investigation, together with blue prints and a written explanation of the device, of what claims are made for it, and why? When a device seems to contain the elements of success, let two or more roads be appointed to try it. Let all the data for six, nine and twelve months be collected, together with broken couplers, by the Committee, and have the same open to the inspection of railroad officers and coupler manufacturers.

When I speak of data, I mean full reports of the size and service of the cars, miles run, state of the roads, their curves, grades, etc., and *the safe limit of wear at all working points of each coupler*, together with such other information as the Committee may deem desirable. One year's reports as above will be a saving to both railroads and coupler manufacturers. To have such official information gathered from numerous sources would give General Managers, Master Car Builders or other officers something definite to guide them in their future purchases. If any road desires to carry on independent experiments there can be no objection, and undoubtedly the officers would be willing to keep their reports on the same lines and plan as the Committee, and furnish the latter with copies of the same.

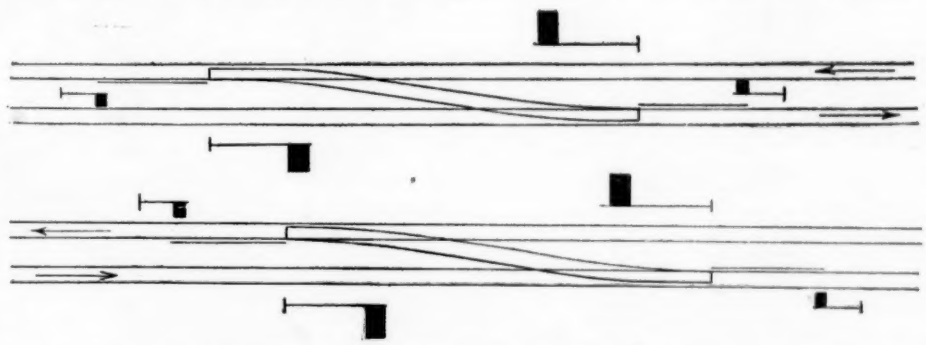
FREDERICK ROBERT.

Signaling a Double Track at a Crossover.

CHICAGO, Oct. 31, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I inclose a diagram showing two different methods of signaling a double track railroad for direct movements and reverse movements at a crossover. Both schemes involve the use of high signals at the fouling point to govern the direct movements; also the use of dwarf signals at the end of detector bars to govern the reverse movements. The difference between the two schemes is



that in one case the dwarf signals are placed between tracks, and in the other case outside of tracks. The first arrangement is based on the theory that always, when possible, a signal should be at the right-hand side of track for trains moving in the direction intended to be governed by said signals; while the second arrangement is based on the assumption that reverse movements are generally made with an engine running in backward motion, and that therefore the signal governing such reverse movements should be on the left-hand side when facing same, and which would, under those conditions, be the engineer's side.

This is a matter on which I differ with an eminent signal engineer, and on which I find no settled opinion among railroad men. I should therefore be much obliged if you could bring out the opinion of interested parties.

X. Y. Z.

The Secretaryship of the Am. Soc. C. E.

BROOKLYN, N. Y., Nov. 8, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the list of names of officers of the American Society of Civil Engineers, recently submitted by the Nominating Committee for ballot at the annual meeting, is that of Mr. John C. Trautwine, Jr., for Secretary.

The election of a non-resident Associate as Secretary, and consequently Director and Trustee, of the Society, would conflict, in letter and spirit, with its organic law, as these quotations from the constitution show:

"Art. II.—*Membership.* Sec. 2—. . . Associates . . shall possess all the rights and privileges of Members, except the right of voting.

"Art. III.—*Admissions and Expulsions.* Sec. 9—Persons elected and duly qualified, who shall reside within fifty miles of the post-office of the city of New York, shall be deemed Resident, and those who reside beyond this limit shall be deemed Non-Resident.

"Art. IV.—*Dues.* Sec. 1—Members who become Resident or Non-Resident by removal . . . shall be subject to assessments in the class in which they were on the day of the Annual Meeting. . . .

"Art. V.—*Officers.* Sec. 2—The President, Vice-Presidents, Secretary, Treasurer and Directors shall constitute a Board of Direction, and shall be the Trustees of this Society, under the provisions of the law.

"Art. VII.—*Nomination and Election of Officers.* Sec. 4— . . . A Nominating Committee . . . shall present . . . the names of the persons selected by them as candidates for officers. Of these, at least one Vice-President, three Directors, the Secretary and the Treasurer shall be Resident Members."

In the "List of Members," dated August, 1890, the nominee for Secretary appears as Associate, residing at 3,301 Haverford street, Philadelphia, Pa:

Clearly an Associate, being as such, denied the right of voting in determining the action of the Society, would not be eligible to election as Director or Trustee.

G. LEVERICH.

[The first objection raised by Mr. Leverich will be easily overcome. Mr. Trautwine will reside in New York if elected. The second objection seems hardly likely to be more troublesome. The law under which the Society is incorporated provides that it may elect from its members its trustees, directors and managers as specified in its by-laws. The constitution divides Active Members into three classes—Members, Associates and Juniors—and the last two classes have all the rights and privileges of Members, except that of voting. All the active members specified in the constitution would doubtless be included in the term "members," as used in the law. The division into three classes is merely technical. Therefore Associates and Juniors are apparently eligible to any office, so far as the law of the state and the constitution of the Society go. We see nowhere in the constitution anything to conflict with this view. On the other hand, the constitution constantly uses the term Member as including Associates and Juniors. In fact, these latter terms do not appear in the last six articles of the constitution, but all are spoken of as Members. To be sure, Associates cannot vote, and the Secretary is a member of the Board of Directors and a Trustee, but it is nowhere said that he *shall* vote in those bodies. Moreover, it may have been the intention of the framers of the constitution that Associates and Juniors should vote on committees and boards. But it takes an exegete to interpret a document so loose as the Constitution of the American Society of Civil Engineers.—EDITOR RAILROAD GAZETTE.]

Starting Apparatus for Compound Locomotives.

HANNOVER, Oct. 29, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention has been drawn to a letter which appeared in your issue of Sept. 19, which I think calls for a reply from me.

My condemnation of the Lindner and every other starting gear without intercepting valves is not based only on the trials with *one* express engine, as Messrs. Hope & Co. believe, but with three years' experience with all our compound engines built before 1885. All these engines had a starting gear that worked precisely the same as Mr. Lindner's, there being a reducing valve to give live steam to the receiver from the regulator pipe and a check valve to release the high-pressure piston from back pressure.

I was myself, up to 1885, of opinion that the engines ought to do without intercepting valves, but I was convinced by practice that they were not sure enough in starting under all circumstances. Since the application of the intercepting valve our engines take heavier loads than before, because the drivers are now sure to lose no time in starting, as often happened with the former arrangement, and as also was the case with the Lindner valve when put on the one express engine. I shall be glad to hear what results the Pennsylvania Railroad will get with the latter gear, and believe our American friends cannot do better than try everything themselves and thus gain a practical knowledge. This will be better than long discussions in the papers.

The disadvantages Messrs. Hope & Co. fear with the valve we use do not exist in practice on any one of the

numerous railroads where now more than 700 engines with this valve are running.

When shunting, etc., the engines make the slightest movement with perfect sureness because they work then just as an ordinary engine; this was not the case with the former arrangement. I would also point out that the starting of my engines with steam pressure in the receiver occurs in practice with perfect security. The valve works contrary to the opinion expressed by Messrs. Hope & Co. against such steam pressures, therefore the "dangerous" qualities of the engines exist only in Messrs. Hope & Co.'s imagination.

On the other hand, Mr. Lindner's latest arrangement with a separate port in the regulator to give steam to low-pressure cylinder or receiver when full open (applied by myself in 1880 to our first two small compounds) is dangerous because when a slow movement is to be made with the low-pressure piston at work, not only is the receiver filled with wire-drawn steam, but the high-pressure steam chest with steam of full pressure, causing both pistons to work even after the regulator is shut, the high pressure at least one stroke, the low pressure ⅜ of a stroke, before all that steam is worked up. In such cases the engine can only be stopped by operating with open cocks or by the brakes.

Another fault of the Lindner gear seems to have been experienced with the compound goods engines built for the Wladicaucase Railroad. These engines have no even tractive force when working slowly up gradients, but a periodical unequal motion. As such uneven motion has never been shown by our goods engines, it is probably caused by that slide channel by which the steam is leaking from the front side of the high-pressure piston into the exhaust during the expansion, causing a periodical want of tractive force. If this is true it would be better to apply a check valve instead of that channel, to avoid such leaking, as we did formerly.

When Messrs. Hope & Co. believe my condemnation of starting gears like Mr. Lindner's is groundless, your readers will see they are mistaken, as it is based on full experience with starting gears of the same working principles as Mr. Lindner's, constructed by myself long before that gentleman patented his gear.

VON BORRIES.

Swing Motion Trucks.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I saw a few days since a locomotive of the two-wheel type with a swing truck at the front end, and much to my surprise this truck was made with the swing links parallel and about 8 in. long; that is, with the same distance between the top and bottom bearings. Now this construction seems to me so bad, and is so contrary to the teachings I received as a youth, that I want to ask you what new theory has arisen which gives this arrangement a place on a modern locomotive? I was taught that such a motion, having no definite central position, would result in the grinding of the front driver flanges as well as those on the truck wheels. You are, of course, aware that such an arrangement differs from the accepted practice in Europe, and has no precedent here that is well known to me. So also it differs in action from the theoretical truck, as I see it, because the engine at the front end has no tendency to keep a central position over the truck, but may be on either side of that centre an inch without returning to a normal position on a straight line. LOCOMOTIVE.

[Our correspondent has evidently discovered some very bad construction in the matter of engine trucks. A parallel swing link is a very unsatisfactory arrangement for locomotive trucks. If the links are made about 8 in. long, as our correspondent states, then there is about 2 in. movement, 1 in. either side of the centre of the front end of the locomotive, during which it will meet with no lateral resistance, and a truck will ride against either the right or left hand rail on a straight track with equal stability. The amount of lateral resistance induced by the movement of a swing truck under the parallel links is very small indeed, and the friction of the joints of the truck more than overcomes it; hence, as before stated, the truck has no well defined position on a straight track. This whole matter has been presented in the *Railroad Gazette* this year, and we quote from page 605:

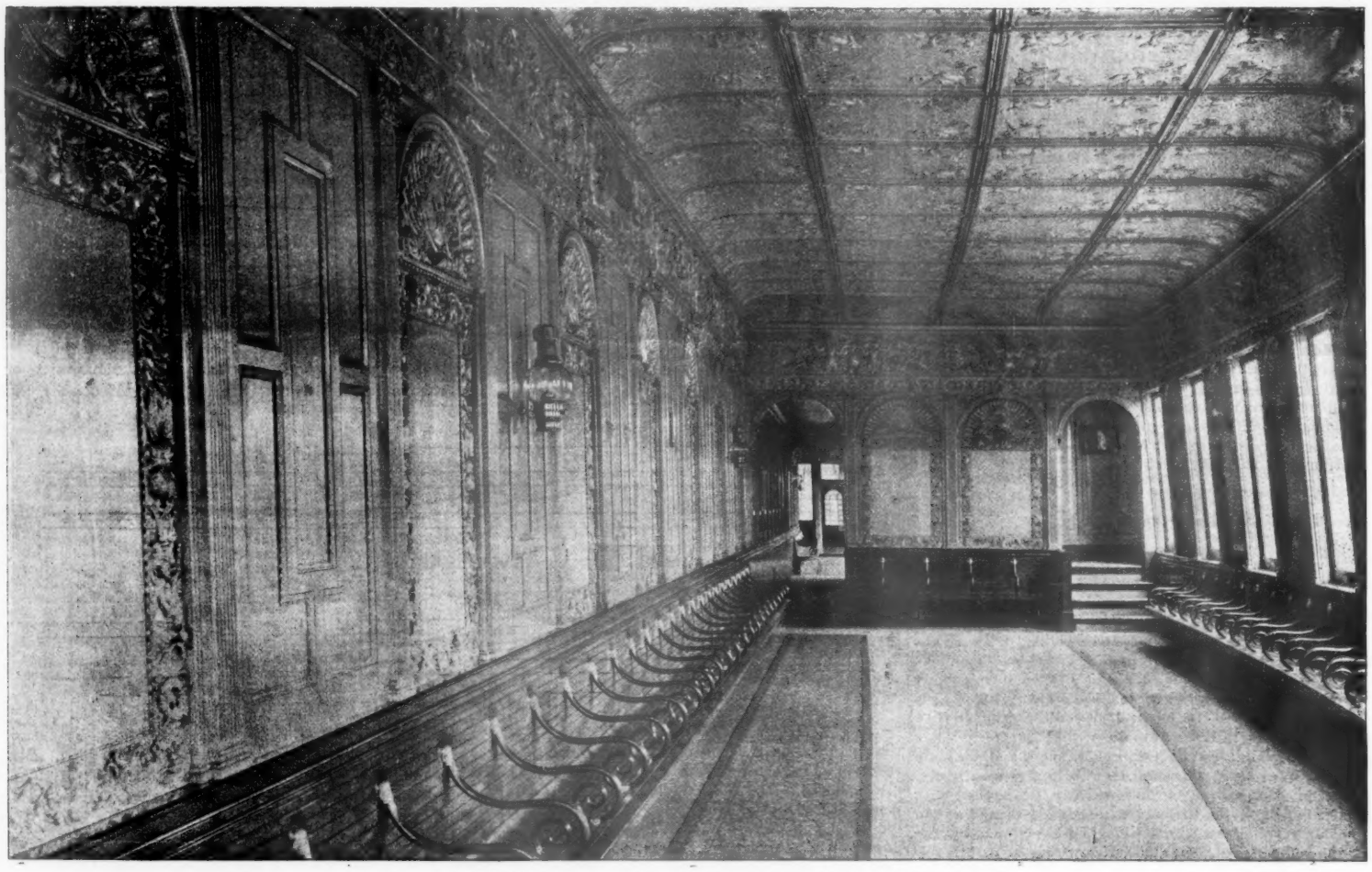
With the parallel links there is no initial lateral pressure, and the engine is free to move some little distance each side of the centre without meeting any considerable resistance.

As to whether an initial resistance is necessary or not, there is no good ground for dispute; the balance of opinion is decidedly in favor of such an initial resistance, and it accords with good reason. It is not desirable that the front end of the locomotive move laterally except when necessary. Too much freedom at the front allows the locomotive to oscillate and remain out of centre, the effect of which is to cause flange wear, and it is one of the most prolific of all the conditions that produce such wear; it is equivalent to moving the centre pin of a rigid truck out of centre. Now no one for an instant would think of placing a truck out of centre with the centre line of the front end, and if done all would expect to find the front drivers and the truck with worn flanges. Parallel swing links for an engine truck will bring about this result in this way. There is almost no resistance made when the front of the engine hung on parallel links swings one inch either way from the centre, except that due to the friction of such movement. If in this condition the engine leaves a curve, the chances are that the truck will not return to the centre because of the friction of the links, but remain with the wheels grinding against the inner or outer rail, as the case may be. Therefore it is highly desirable that there be some initial lateral resistance which will overcome the friction, and bring the engine exactly to a central position whenever it leaves a curve, or is displaced from any other cause.

On page 619 the following conclusions were given:

While the total lateral displacement in the case of the parallel swing links is considerable, and the increase in lateral pressure for a given displacement is less than with the links inclined, that is, for small displacements, yet there is no initial resistance, and such an arrangement of links is undesirable unless the initial resistance is given with the spring.

Just now the swing truck is receiving considerable criticism, and some of it is decidedly unjust. This device is a good one, and has its purpose in railroad rolling stock; but no one need expect that its true value will be brought out, or that it will not receive adverse criticism, so long as it is constructed in a manner which causes it to interfere with rather than to assist the operation of the engine or car under which it is placed. Such a design as that to which our correspondent refers is one which, if followed, would but lead to the condemnation of the swinging truck. Any engineer knows that a swing truck requires the most careful analysis for each individual set of conditions, and that a swinging truck which is good for one engine is not necessarily good for another. A variation in the length of wheel base or in the distance from the centre of the truck to the extremity of the driving wheel base calls for a change in the location and length of the swing links. This makes a different truck necessary for a 10-wheeler, a consolidation, or a mogul; so also a Forney engine truck must differ from that for an eight-wheeler. If the track be one having sharp curves, then the swing links must permit greater freedom than when the track has a low maximum curvature. We do not think it necessary to go far into this subject now, having devoted so much attention to it already in the issues of the *Railroad Gazette* before referred to (Aug. 22 and Aug. 29), but we cannot pass by the particular design of truck mentioned by "Locomotive" without insisting that it is radically bad, as it will result in the condemnation of the swinging truck because it does not perform the office for which that truck is intended, which is to hold the front end of the locomotive as nearly as possible in the centre of the track. Such a truck as described by our correspondent will not do this even on a straight line. When a truck will not do that, it ceases to be a guiding truck and becomes only a carrier, such as one might be supposed to introduce as a central support truck in a freight car. Surely no one would advise the use of such a device for the front end of an engine.—EDITOR RAILROAD GAZETTE.]

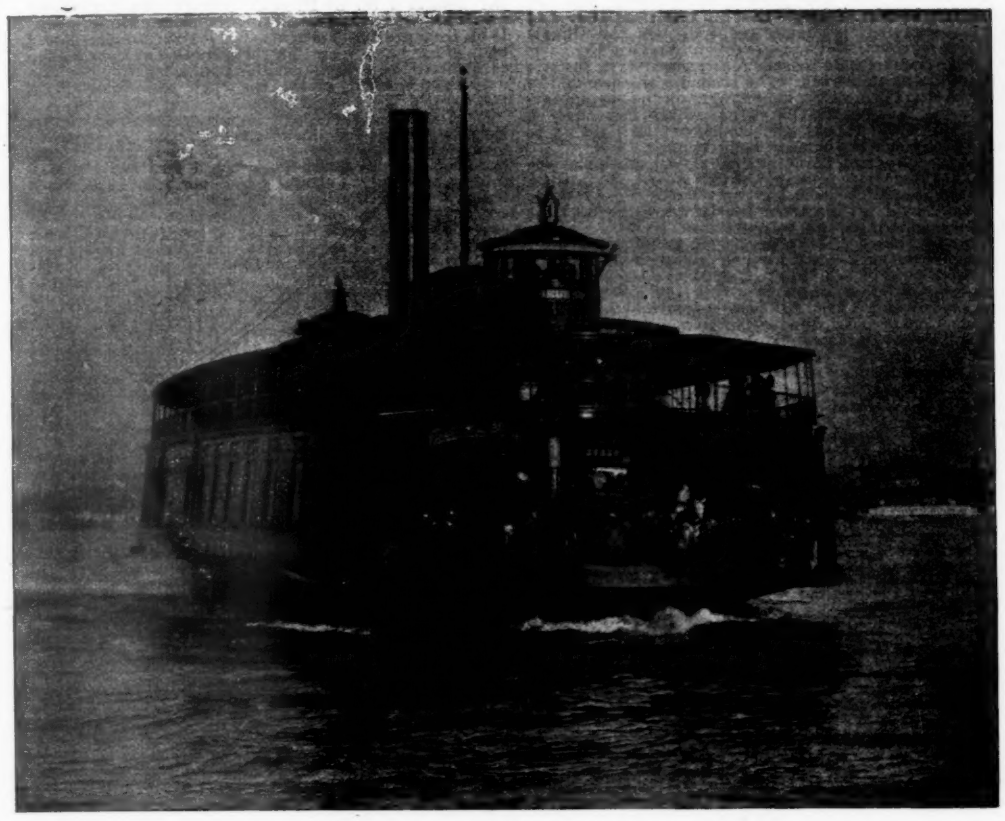


THE PENNSYLVANIA FERRYBOAT "NEW BRUNSWICK"—LADIES' CABIN.

The Double-Deck Ferryboats of the Pennsylvania Railroad.

An advance movement is being made by the above company in placing double-decked ferryboats on its lines across the North River at New York City.

One boat, the New Brunswick, is now in service on the Desbrosses street route, and a new one, the Cincinnati, is under contract and will be put in use as soon as com-



THE DOUBLE-DECK FERRYBOAT "NEW BRUNSWICK."

pleted. No expense will be spared to make these boats attractive, comfortable and perfect in accommodation.

We give two views of the New Brunswick, one of the outside and one from the inside, showing the appearance and ornamentation of the ladies' cabin on the main deck.

The tints of the walls, ceilings and glass are old ivory and pearl; the seats are in mahogany and bent wood. The floors of the lower saloons are covered with tiling of Mosaic pattern, with carpeting along the seats of the ladies' cabin. The floors of the upper saloon are carpeted throughout.

The object of the upper deck is to enable passengers by rail, taveling to and from the city, to pass direct to or from the new elevated tracks of the company in Jersey City, without coming in contact with the horses and trucks of local traffic on the main deck. The upper deck will also, on the New York side, connect with special foot bridges across West street, relieving the passengers of the disagreeable risks and dangers of that troublesome thoroughfare. The upper and lower cabins are connected by central stairways in short flights. The seating capacity of the boats is greatly increased.

The cabins are heated by hot air admitted from above and passing out at floor levels. Cold air is taken originally from the outside, forced through a steam-coil heating chamber by means of a Sturtevant blower, thence through air ducts to registers at the upper levels of the cabins. To control the temperature, Johnson thermostats are located in each of the cabins and act individually to control the admission or non-admission of heated air.

Electricity is used for lighting purposes. The plant is furnished by the United States Co. There are 167 incandescent lights scattered throughout the cabins and passageways, giving a brilliant daylight effect to the surroundings.

The pilot house is supplied with a Williamson steam steering gear, automatic and efficient in every respect. The operating machinery is all below decks in easy reach of the engineers for oiling and care.

The Pennsylvania is the first to use the overhead system of heating for ferryboats, and was the first to adopt the steam steering geer. The Baltimore was equipped with it in 1885, the Chicago in 1886, and the balance of the ferryboats in 1887. The Williamson gear is used on all.

Swing Beam Trucks.

At the October meeting the discussion on the above subject was continued. Extracts from the remarks of the various speakers follow:

Mr. WM. FORSYTH: I have only to say that I do not believe there is any definite information on this subject among railroad records. The railroads do not keep a separate account of truck repairs as separate from car repairs, and I do not see, therefore, how it is possible to make any statement of the relative cost of maintaining swing trucks and rigid trucks. The case is similar with the other part of the question; that is, what has been observed as to the effect of these two trucks on flange wear, because there have been no separate accounts kept by the railroads of the flange wear of the different trucks. Now the place where master mechanics do take notice of these points, and where the observation is made, is in the case of engine trucks. There, even if they do not keep an account, they notice a great deal more closely what the cost of repairs is, and how fast engine trucks are wearing out. I think it was a gentleman's testimony at the last meeting that swing beam trucks on engines would wear out rapidly, and that the cost of maintenance was large, and that it was probable that a rigid truck would be a better type for engine trucks—engine tender trucks, I mean—at least for the passenger trains, because they get such severe service and run faster than in freight service, and consequently wear out more rapidly. I think it is the general testimony of most master mechanics that swing beam engine trucks will wear out faster than rigid beam engine trucks. Now, we noticed this so much on our road, that four or five years ago we decided to abandon swing-beam trucks for our passenger engine tenders, and ever since we have used rigid trucks, and they give us very good service. The repairs are very small as compared with those when we had swing beam trucks. In regard to cars, Mr. Rhodes explained at the last meeting, concerning our practice, that, although we have perhaps 6,000 swing-beam trucks on our road, when the proposition came up to change to a rigid truck there was no opposition made on the part of any of our master mechanics; that they had concluded that the cost of maintaining the swing beam trucks was so much greater than that of maintaining the rigid truck that they all favored changing them.

In the case of the swing bolster truck, after the truck strikes a curve and comes in contact with the swinging bolster the tendency is to hug onto it and not to change position as soon as it should, and my impression is therefore that the little good which this swinging does is offset by the continued action in the wrong direction. Besides this is the extra expense of the truck and of its maintenance. For these reasons I have come to the conclusion that there is not enough in the swing beam form to justify the extra expense in its first cost or in its maintenance.

The Secretary here read a letter received from Mr. Barber, of the Northern Pacific, descriptive of the swing beam truck as used on that road, of which truck a model had been placed on the table. "For the past seven years, as Master Car Builder, my experience has forced me to believe and see the necessity of a more durable pattern of trucks than the present style of swing beam truck. I have also made several tests as regards flange wear, and the wear of journal bearings on rigid trucks and swing beam trucks, and these tests show that a truck which has a certain length of vibratory or swinging motion makes a saving in wear of wheel flange and journal bearings of fully 20 per cent. This swinging motion, however, should not be more than ¾ in. each way from the centre, nor less than ½ in. There has been considerable said concerning side bearings not curving properly, and they are recommended to be made stronger and larger. The prime cause of trucks not curving on account of tight side bearings is the centre of the bolster springing downward; and when we increase the capacity of the bolster, with a good reserve, we shall have no more trouble with tight side bearings and trucks failing to curve.

"Mention has also been made that the truck bolster in a swing beam pattern of truck springs backward and forward (while switching) and bends the iron truck transoms outward. The cause of this is faulty construction. A swing bolster that bears against the iron transoms full length will never spring the truck transom except perhaps in severe wrecks. I would particularly call your attention in this connection to a recent iron transom swing beam truck turned out by the North Western. On examination of this I feel sure that you will decide that the swing bolster will never spring the iron truck transom, as the bolster bears against and receives the blow the full length of the bolster and transom.

'From practical test I am led to decide that a car truck, either passenger or freight, should have a swinging or vibratory motion, said motion being arranged so as not to strike harshly or solid, and the springs being guided in a vertical movement and so arranged as not to receive any rocking strain. The many parts in a common swing beam or vibratory truck should be reduced not less than one-half, and the capacity of truck increased fully one-half. I take pleasure in sending you a model of a vibratory truck that has been in service six years, giving perfect satisfaction. You will note that the number of parts has been reduced over 80 pieces per car, the first cost reduced 12½ per cent., the maintenance of repairs reduced fully 60 per cent., and the capacity doubled."

Mr. SCHROYER: Concerning the relative merits of the two trucks I want to ask this question: Is it supposable that 50 per cent. of the roads in this country would use a swing motion truck, as they are doing to-day, if there were not some grounds for their doing so? As regards flange wear, I don't think that there is very much difference between swing motion and rigid trucks, although as regards the power it requires to move a train of cars with either, I believe that the cars with a swing motion truck will draw easiest.

There is one point that I think has been overlooked, and that is the effect upon the coming truck of the use of the Master Car Builders' type of drawbar. With the truck that we have in use we use a link-and-pin bar. We have 4 in. of lateral movement to either side of the centre line of drawbar; hence in a curvature which that truck takes the lateral movement is taken up by the link in the drawbar. Now there is a vast amount of side movement in that truck which is utilized in all curvatures, but when we come to the use of the Master Car Builders' type of bar, all the side movement in the bar is taken up; hence with that bar in general service, we have no side movement at all except what is represented in the play of the flange of the wheels and the brasses. A gentleman cited a case to me yesterday of where experiments had been made to show the ease in riding of the different kinds of trucks; the test was made with three cars, one with a rigid beam and two with a swing motion truck. The test was made by putting a bucket of water on top of the cars. The car with the rigid beam truck spilled all the water out of the bucket; the one with the swing motion truck spilled half the water, and the other swing motion car probably spilled three-fourths of the water.

Mr. COOK: This matter came up before a party of cattle shippers in New York recently and they were decidedly of the opinion from observation that cattle came to the New York market over swing beam trucks weighing five per cent. more than they did when coming over rigid beam trucks.

Mr. BARR: There seems to be a kind of sentiment in favor of the rigid beam truck, and I really don't know what it arises from. The rigid beam truck is a little cheaper than the swinging beam truck. We are all prepared to admit that, and if that is the reason why the sentiment is in favor of the rigid beam truck, there is nothing further to be said. I have not seen any argument that I consider worth anything that goes to prove that the rigid beam truck is better than the swinging beam truck. Mr. Schroyer spoke of the experiment with the buckets of water; that was an experiment that I tried myself, and I can assure you that the difference in the amount of water splashed out by the three different cars was remarkable. Now, if we are carrying a car along the road with a truck in such condition that it produces such a vibration of the car body, it seems to me that we are doing something to damage the car body and to increase the cost of repairs. We are certainly carrying that car in a way that will cause more trouble from loss of nuts and in maintaining the car in proper condition. I think the probabilities are that what you save in the truck will be much more than overbalanced by what it costs you to maintain the car. It certainly seems to me that in arranging a truck it is a wise thing to provide some motion that will not roughly transmit the weight of the car body, load and trucks to the wheels. If there is an objectionable side motion there, it certainly stands almost as a foregone conclusion that it ought not to be transmitted rigidly to the wheels. You can carry the thing a little further, and suppose you have an absolutely rigid structure from the top of the car down to where it touches the wheels. I think all of you will agree with me that such a car will not run very long before it has to go to the shops, and it seems to me that a provision for a swinging motion in the bolster is providing what is required just in the right place. It seems to me that the swing truck is a good mechanical contrivance; it attains the end desired, and while there is not enough difference to make it very palpable to an observer, I believe, taking everything into consideration, that the swing beam truck is decidedly the best, and that cars equipped with it can be managed cheaper than those equipped with the rigid truck.

Mr. GIBBS: I was looking a little while ago at a piece of track which they had been raising and reballasting. A freight train came along; the bank was narrow, and the track was considerably above the level, worse, of course, than the average condition would be. But I could have told, with my eyes shut, every rigid truck car that passed from the whack that they gave on the rails. In fact, I did; I noticed every one of them; you could easily tell the difference between the two cars.

Mr. G. W. RHODES: The difference in cost between a swing beam truck on the C., B. & Q. road as we formerly constructed it and the rigid truck as we now construct it is $3.50 per truck. That on an order for 1,000 cars would mean $7,000. Now the figure is large enough, and it seems to me it is one which railroads will do well to consider in placing orders for cars. The first cost of one over the other is considerable; but it is not the first cost that has induced our road to make the change; it is the cost for repairs. We have found that the portions that convert the truck into the swing motion truck are those that are constantly needing repairs; they require more repairs than any other part of the truck—that is, the short axle and the hangers. I expect to make as much of a saving in the repairs of our rigid trucks over the swing beam as we do in the first cost.

Mr. BARR: I would like to ask what the repairs consist in.

Mr. RHODES: The repairs are largely necessitated by the bending of the axles, and also by the breaking of the castings which the axle rests in.

Mr. BARR: It seems to me that in making a comparison in trucks, failure from bending should not be taken into consideration, because a little increase in the size of the parts would in all probability remedy that. The fact of the matter is we use the 3 × 3-in. swing beam axle for our 60,000-lb. cars, and I don't think that we would be put to any expense from the axles bending. There is a certain amount of wear there that will have to be attended to in the course of time, and some years ago to obviate that trouble swing trucks were built with simply a strap passing under the swing beam. My experience with straps has been that after they have been run a number of years they commence to develop a crack in the corner and break. I believe we are better off to use the old axle and replace it when it wears to a certain limited size. It is possible that it costs more money to maintain the swing beam truck than the rigid truck,

but I don't think that any one should feel altogether clear in saying absolutely that it does, unless he has actual figures to show it.

Mr. MACKENZIE: There is one thing I think ought to be eliminated from the problem, and that is the inequality of the track. We do not have poor tracks in this country any more; our tracks are such they will carry the most rigid truck that is built. The great object now is to have the best track we can possibly build. Anywhere that is done the rigid truck is the truck for a railroad.

Mr. BARR: I begin to get an idea of the argument for the rigid truck, and I don't know but what if I were indorsing it I would shove the argument a little bit further, and say that we ought to dispense with trucks altogether and attach our wheels to the body of the car, just as the English practice is, and then we would have the best thing going.

Mr. BARR: If there is nothing in the swing truck then I would go on further and advocate that we take the swing motion out of our passenger truck and thus have a better and cheaper truck.

PRESIDENT PECK: We have a swing motion on many of our cabooses, but on a great many of them we have taken it out.

Mr. VERBRYCK: I think if you were to carry a great many drovers on your "little jumpers" you would find a difference. We have got to have as good a truck under our cabooses as under our passenger cars, because we carry a great many drovers who sleep in the car and their bolster beam, and gave it more swing, and the cars ran better. I know that at one time they had a great many sharp flanges reduced. On the Illinois Central we are having most excellent service from our wheels. I gave three reasons for it; the first is the use of a swing motion truck. The second is the use of the long hanger; I think the long hanger on the swing motion truck is one of the things that makes it a success. The third is the use of larger wheels, which have a tendency to reduce the cutting of the flanges.

Mr. SCHROYER: I would like to ask you what the percentage of decrease of flange wear is and what is the average life of these wheels.

Mr. DARRALL: I have not any data with me, as I did not come here intending to enter into discussion at all. I should be pleased, if the discussion is carried over to another meeting, to gather up such data as I can and I think it would be beneficial. But I know the wheel service on the Illinois Central is giving great satisfaction and I attribute it to the size of the wheel and to the long hanger in the truck. We use the 36-in. wheel.

Mr. SCHROYER: I would like to have this question answered by some one of the rigid wheel advocates: What percentage of wheels are removed from service under trucks having rigid beams, for sharp flanges, and what is the average life of those wheels that are removed?

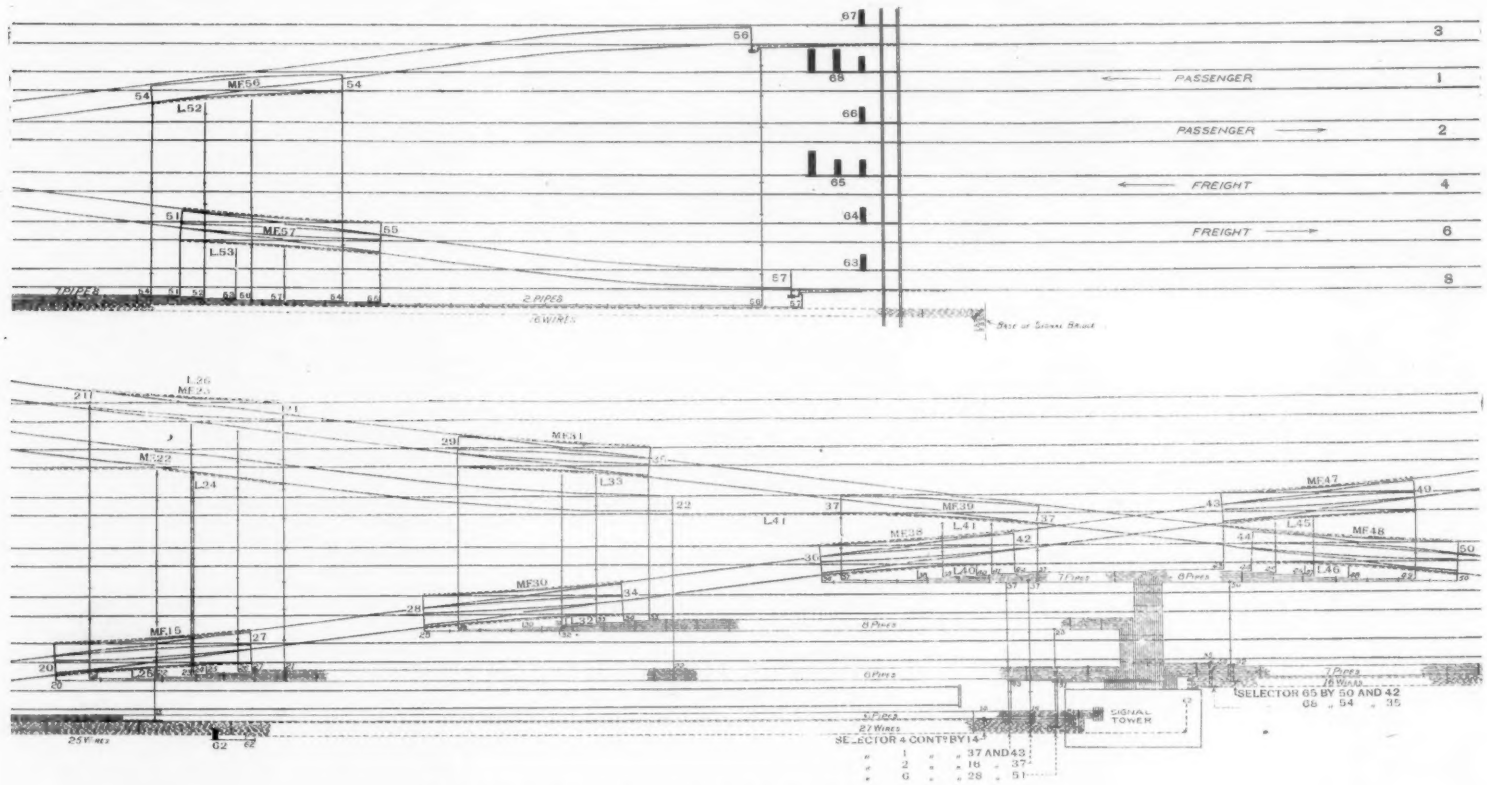
Mr. BARR: There seems to be an idea that we can settle the relative merits of the rigid truck and the swing beam truck by watching the wear of the flanges. I think the hanger 6 in. in length. I don't think anybody has. I know that our own is nearly twice as long; about 11 in. from centre to centre. We do spread the lower ends of the hanger, and for the purpose not to bring the car back to the normal position again, but to raise the outside of the body of the car when passing around a curve.

Mr. FORSYTH: There is an important point which Mr. Barr has suggested about sharp flanges. It seems to me that the measure of the good of the trucks one way or the other is in sharp flanges, and Mr. Barr seems to think we cannot get the facts from our records of sharp flange wheels. But if we take one road that has swing trucks, and 30 per cent. of its wheels of equal and definite quality—the same kind of wheels—are removed with sharp flanges; and suppose the track and everthing else is equal, and then take another road where all conditions are equal, and they have the rigid truck, and the number of removals is 20 per cent., we will not have a measure of the relative flange wear of wheels with two trucks?

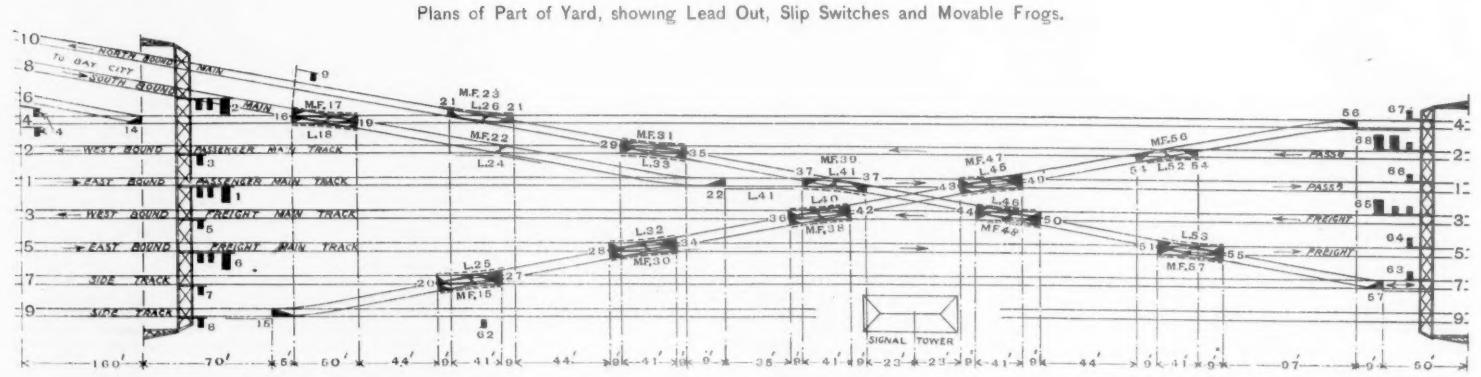
Mr. BARR: I would simply say this: If one road has 30 per cent. of its wheels scrapped on account of having worn flanges, and the other road under similar circumstances has 20 per cent., I think anybody could see that about 80 per cent. was due to the difference in quality.

Mr. FORSYTH: But I say equal quality, the wheels being from the same foundry.

Mr. BARR: The point is simply this: In removing a pair of weels, in ninety-nine cases in one hundred you



Plans of Part of Yard, showing Lead Out, Slip Switches and Movable Frogs.



INTERLOCKING AT BAY CITY JUNCTION, DETROIT—MICHIGAN CENTRAL RAILROAD.

you would find they would not want to ride in a car with a rigid truck.

MR. DARRALL: I want to speak of a matter that occurred on the Union Pacific a little while ago. We had some engines running between Cheyenne and Sidney—a track with which Mr. MacKenzie is well acquainted. The eastern portion of this track, which is 100 miles long, for about 70 miles is very straight; the other portion, about 30 miles, is very crooked, and up hill and down. In that district we had 13 engines; out of those 13 engines there were eight of them freight. For two years I was unable, with those engines, to keep my tender wheels from cutting flanges. I did everything possible with the tender trucks on these engines, but I could not get those wheels to stop cutting on the left side of the engine. They always cut on one side, until I got a swing motion truck.

In 1883 I had occasion to buy some box cars, and the question arose in my mind whether I should adopt the rigid truck or a swing truck, and I spoke to several master mechanics that had years of experience, notably one named Cobwell, and he said, "Use the swing truck by all means." I asked him why. He said they had used the rigid truck, and they found the swing truck to be better. I told him I would like to see the trucks; so he took me down and I examined them, and found they had cut the swing of the bolster down to a quarter of an inch. It seemed to me that that was a rigid truck; I didn't call it a swing truck. Afterward they shortened every one who has observed this matter will agree with me in saying that out of every one hundred pairs of wheels removed from cars ninety-nine of those pairs have one flange worn and the other flange almost as good as the day it went into service. If that is so, how can we determine the relative merits of the two trucks from watching the wear of the flanges?

Mr. MACKENZIE: There is one question that Mr. Barr raises that is not a new one; that if the truck is not a good one, why don't you take it out of your passenger cars? I am not a very old man, but I can look back to the day when the swing beam in a passenger car was 18 in. long; to-day it is not 6 in. Why is that? What is the 6-in. swing in the passenger car to-day—a hanger, I mean, 6 in. long in the beam? How much action does that beam have under that car? Why are they shortened up to-day and spread out at the bottom, if not to enable them to come back to the centre just as quick as we can get them there?

Mr. DARRALL: I was under the impression that Mr. MacKenzie when he first spoke was in favor of the rigid truck, but I am afraid he is going to build a swing truck hereafter. When he gets to looking into the merits of the hanger, the length of the hanger, I think he is on the right road, and when you get the hanger the proper length I think the wheels will give you better satisfaction. But, as he says, with a 6-in. hanger you have no swing at all.

Mr. SCHROYER: I don't know of anybody who has got will find the flange worn on one side and on the other the flange as good as when it went out of the foundry; and you will find the other pair of wheels under the same truck in the same condition; sometimes the worn flanges being on the same side of the truck and sometimes on diagonally opposite sides. That can be demonstrated in five minutes' observation at any railway shop in the country.

Mr. MACKENZIE: Are there not conditions connected with the wear and tear of wheels that would make it a very difficult matter to determine whether it was the truck or not that caused the flange wear? There are soft wheels and defects in mounting wheels also.

The discussion was here closed.

Interlocking at Detroit.

The signaling and interlocking of the Bay City Junction in the Detroit yard of the Michigan Central Railroad is a remarkable instance of modern American practice. We have repeatedly pointed out the ingenuity with which signal engineers get the maximum work out of a lever, and thus reduce to a minimum the cost of the plant and the time and labor of operation. In the example before us the machine is built for 68 levers, of which 8 are spare. The 60 working levers move

67 facing point locks, 43 switches, 12 movable point frogs and 27 signals. These are distributed as follows:

24 levers for 43 switches, 4 movable point frogs, 4 locks.

8 levers for 8 movable point frogs.

12 levers for 63 facing point locks.

16 levers for 27 signals.

That is, 60 levers operate 149 signals, switches, locks and frogs. In the new plant at the Grand Central Station, New York City, described by us last December, 87 working levers operate 73 switches, 73 locks, 55 signals and 32 indicators. Although the moving parts are more per lever in the Grand Central plant than in that at Detroit, the work per lever is probably really less because of the relatively greater number of light parts,—signals and indicators. The interlocking of the Jersey City terminus of the Central of New Jersey, which we described in June, 1889, was another example of the same kind of economy. In that plant the levers are:

22 levers for 40 switches and 3 movable frogs.

1 lever for 2 movable frogs.

14 levers for 48 facing point locks.

29 levers for 40 signals, 40 indicators and 1 facing point lock.

Or in all, 66 working levers. The parts moved per lever in each case are: Detroit, 2.48; Grand Central, 2.68; Central of New Jersey, 2.64. The great saving effected in the two plants last mentioned was pointed out by Mr. R. H. Soule in his valuable paper before the New England Railroad Club last December. He said that the Grand Central plant would have required, under the old method, 179 levers, instead of the 87 actually used. This was as compared with the former practice of the Union Switch & Signal company, which built the old and the new plants of the Grand Central station. He compared the Jersey City example with English practice. A plan of the yard, with specifications, was submitted to Messrs. Saxby & Farmer, who advised the use of a frame of 185 levers. The same work is actually done with 66 levers. These three fine plants were all built by the Union Switch & Signal Company.

Of course, real economy is not secured by overloading levers, but by skillful arrangement of the tracks to begin with, and then by judicious use of selectors and other devices. An examination of the plan of the lead out in the Detroit yard shows six selectors.

The free use of slip switches in this case will be noticed. All but four of the crossings have double slip switches, and two have single ones. All but one of the crossings have movable frogs; this one having an angle great enough to permit the safe use of a rigid frog. The other crossings are all on an angle of 7° 10′.

Spring rail frogs will be used in this work wherever it is possible, and where the work is about equal on both tracks the Jordon, double spring frog will be used.

The arrangement of tracks and signals is clearly shown in the engravings. Although the plan of the yard is simple, there are a good many reverse movements to be provided for, and these, together with all the direct movements necessary to let trains pass to and from any track, make a complicated interlocking. The Saxby & Farmer machine will be used, and it is expected that it will be one of the most perfect ever built by the Union Switch and Signal Company.

The Chicago Automatic Steel Coupler.

This coupler is of the M. C. B. standard, vertical plane type and is constructed on the standard contour. In perfecting the device it has been subjected to physical, chemical and actual service tests. Two thousand couplers are now in service. The claims for this coupler are superior strength, simplicity, easy and certain operation, and light weight.

The coupler is made of the best grade of steel, for the reason, as the manufacturers assert, that a coupler that will meet the requirements of the purpose it must serve must not only be able to withstand the severe service to which it would ordinarily be subjected, but must go further than this and withstand the abuses with which it will meet. It is manufactured by the Chicago Tire & Spring Co., of Chicago, Ill. (for the Chicago Railway Appliance Co.), by a new process and from a grade of steel run for this purpose only. This steel is known as "C. T. S." brand. Its uniformity has been shown by the tests made. All couplers are made under a rigid system of inspection, and by the new process of molding every part is exactly uniform to the standard lines and absolutely interchangeable. The weight, comp'ete, is 185 lbs.

The locking bar is chambered in the drawbar, and is provided with lugs cast on each side near the upper rear end. It is pivoted on these lugs, which fit into raised seats, provided with a rounded inset, and which are cast in the drawbar. One end of the locking bar projects through a slot in the bottom of the drawbar, and at this point the unlocking rod is attached. The location of the pivot point leaves the entire weight of the locking bar below the line of support, and the locking bar consequently lies by gravity on the bottom of the drawbar. It is prevented from having any side motion by lugs cast on the inside of the drawbar. The bottom of the locking bar inclines slightly upward at its outer end, to admit of an inclined plane at the end of the knuckle passing under it, which raises the locking bar until the inclined plane has passed, when it falls in front of the knuckle, locking it securely in place. The raising of the locking bar frees the knuckle. The lifting-pin forms no essential part in the locking device. It is used only for convenience in raising the locking bar when a man is nearer to the pin than to the unlocking rod. This locking device is simple, and easy and certain in action. There are no parts subject to undue wear, and snow, ice or cinders do not interfere with its operation. The unlocking rod is attached to the point of the locking bar which projects through the slot in the bottom of the drawbar. It passes to the corner of the car, where it is hung in a clutch casting. The clutch casting is so constructed that in unlocking the coupler the rod can be clutched in the casting, thus holding the coupler unlocked. A slight shock to the car will cause its release. If a car should strike another equipped with this coupler at a time when a coupler was unlocked, the shock would dislodge the unlocking rod and lock the knuckle. The knuckle, like the bar, is made of the "C. T. S." steel. Its form is such that the metal is concentrated in a compact mass to resist blows.

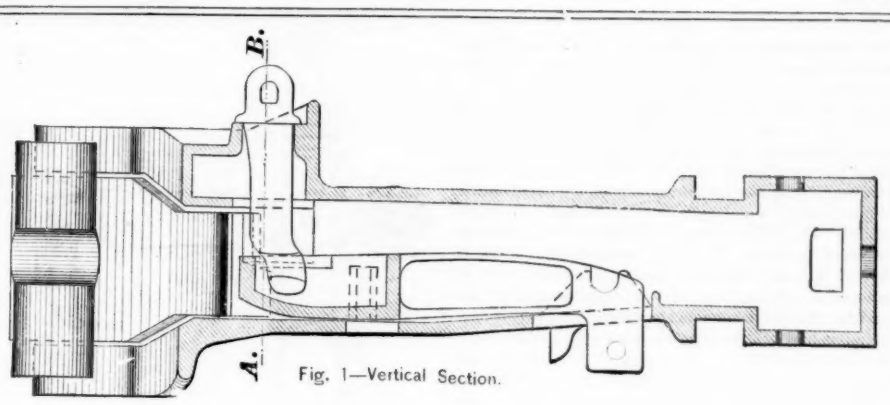


Fig. 1—Vertical Section.

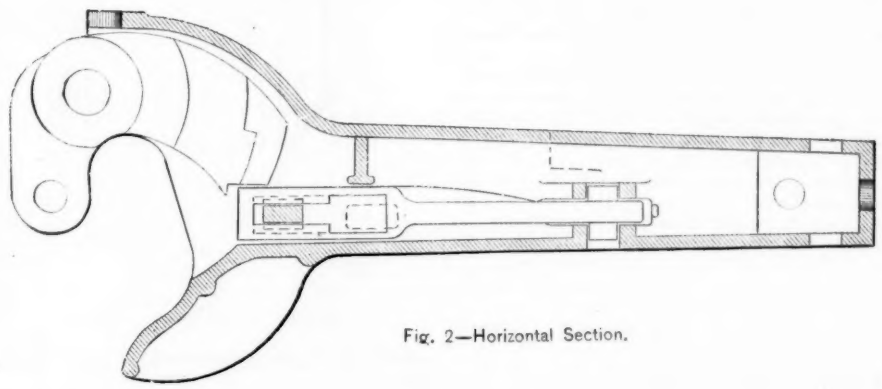


Fig. 2—Horizontal Section.

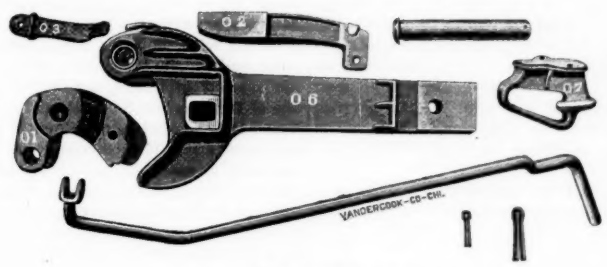


Fig. 3—Plan and Details.

THE CHICAGO AUTOMATIC STEEL COUPLER.

Made for the CHICAGO RAILWAY APPLIANCE CO., *Chicago, Ill.*

The following tests have been made of this coupler:

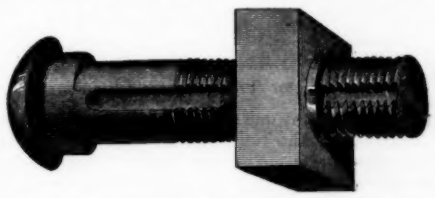
First—For the purpose of ascertaining the ability of the coupler to withstand shocks in service by the throwing of cars together. Two cars loaded with car wheels were equipped with the steel coupler and one thrown against the other. On the fourth trial the cars were damaged so as to be unfit for further use. The speed at which the cars were thrown together increased gradually from about 15 miles per hour to about 30 miles. The couplers were not damaged.

Attempt was then made to break the coupler to show the metal at fractures. A box car equipped with a Potter drawbar was thrown against a car equipped with the steel coupler. The blow was taken squarely on the knuckle, making two indentations therein; no injury was done to the steel coupler. The trucks of the box car were damaged, and had to be repaired before further tests could be made. In this second trial the Potter drawbar was adjusted so as to strike entirely on the arm of the steel coupler, for the purpose of breaking it off. The box car was again thrown back at the highest rate of speed that could be obtained in about a quarter of a mile run, speed judged to be over 30 miles per hour. In this test both cars were wrecked badly, and the arm was broken from the steel coupler and driven into the draft timber; fractures showed good metal.

Second—A test was made to demonstrate the ability of the coupler to withstand a tensile strain. The steel coupler was placed in the testing machine and an ordinary coupling link coupled into the knuckle and over a pin. At a strain of 104,000 lbs. the link broke; coupler not damaged. A second trial was made, and a special link, made from 1½-in. square tool steel, was used in the place of the ordinary coupling link. When subjected to a tensile strain of 139,100 lbs. the face of the knuckle of the coupler was cracked, caused by the bending of the pin so as to form a wedge.

The Champion Nut Lock.

In this device the locking feature consists of a groove in the bolt, as shown, and a ring on the outside of the nut, which is driven into the groove after the nut is screwed down. These bolts and nuts are made in all sizes and sold at a very reasonable price, the cost being



but little more than that of ordinary ones. It is claimed as an advantage that no additional parts are required. It is also claimed that the nuts can easily be removed with a wrench and can be locked and unlocked many times without breaking the thread. This lock is made by the Illinois Bolt & Nut Company, Peoria, Ill.

The Latest Sound Steamer.

The new steamer "Plymouth," of the Fall River line, is now running regularly as a mate to the "Puritan," "Pilgrim" and "Providence;" she is the best of the four, having many marked improvements in accommodation, comfort, safety and service.

The vessel is of 3,778.89 gross tons and 2,280.13 net tons burden, has 247 staterooms and 1,033 berths, and can carry 1,200 first cabin passengers. Some of the staterooms are large and are fitted with complete bedroom sets. The length of hull is 366 ft. over all and 351 ft. 8 in. at the water line; the draft of water loaded is 12 ft., the breadth is 50 ft. on the hull and 86 ft. at the guards.

The engines are of triple expansion type, having four cylinders; the high-pressure cylinder is 47 in. in diameter, the intermediate 75 in. in diameter, and two low-pressure cylinders are each 81.5 in. in diameter. The

stroke of the engines is 8 ft. 3 in. Five thousand horse power is developed with 160 lbs. of steam, and 28 revolutions of wheels. The wheels are 30-ft. diameter at the outer edge of buckets. Each wheel has 12 buckets of steel, 13 ft. 3 in. long by 4 ft. wide. One low-pressure and the high-pressure cylinder connect with a pair of cranks on the starboard side, and the second low and the intermediate cylinders connect with a pair of cranks on the port side of vessel, with a central bearing between the cranks. The main journals are 22 in. in diameter, the outboard journals 25.5 in. in diameter by 40 in. in length. Each low-pressure cylinder exhausts into an independent condenser, and the circulating pumps are operated by small independent engines. The high-pressure cylinder has a Sickles valve gear; the other three cylinders have a Stevens valve gear. The cranks are set at right angles to each other. A ventilating and light-shaft extend from the engine room to the top deck.

The boilers are of steel, eight in number, having in all sixteen 43-in. furnace flues and 1,280 3-in. tubes 9 ft. long, or two 43-in. furnace tubes and 160 3-in. tubes for each boiler. The shells are 13 ft. 1 in. long by 11 ft. 3 in. in diameter. The shell metal is .98 in. thick, with 60,000 lbs. tensile strength and 46,000 ductility. The boilers are set back to back athwartships with two fire rooms and have a common smoke-stack 10.5 ft. diameter and extending to 86 ft. above the water line.

The donkey boiler and engine as also the wrecking apparatus are placed on the main deck over the main boilers, handy in case of fire, accident or collision. A duplicate electric plant furnishes light throughout the vessel. A speed of from 22 to 25 miles per hour is expected of the vessel under favorable circumstances. The control of both vessel and engines is first-class in every respect, and every conceivable emergency is provided for.

Electric Selector for Pneumatic Signals.

The engravings shown herewith illustrate the details of the electric selector used in connection with the Union Switch & Signal Co.'s electro-pneumatic system of interlocking. Fig. 1 shows the apparatus as used on an ordinary semaphore, the selector being attached to the post just below the semaphore arm. Fig. 2 is a cross section of the same apparatus, and figs. 3 and 4 show front and side views respectively of a post with indicators attached.

It is, perhaps, unnecessary to explain that a selector is used where a single semaphore is employed to give an

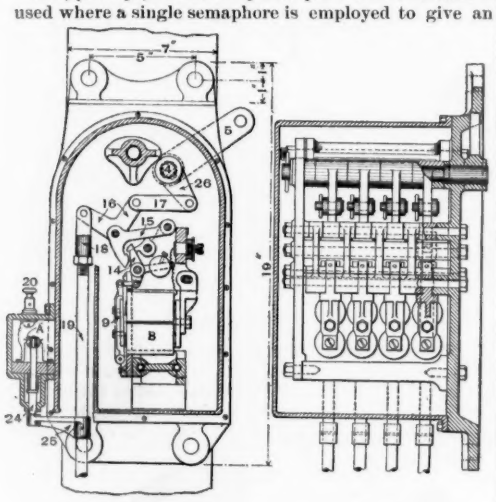


Fig. 1. Fig. 2.
Electric Selector for Pneumatic Semaphore.

all-clear signal to any one of several different routes, a disc, designating the route, being shown just below the semaphore arm. The disc (dark colored) has a number or figure cut in it, with a sheet of glass attached on the rear side; this makes the number or letter visible day or night, inasmuch as after dark the lamp located to the rear of the indicator disc illuminates the same.

The precise office of the selector is to provide electrical means of engaging one or the other of several indicators with the signal arm in a way to cause their simultaneous operation, and the pattern here shown further insures that an indicator can never become displayed excepting when the signal itself has been cleared.

In fig. 1 the arm 5 is connected with the blade by a rod 27 (fig. 3) which, when the blade is depressed, causes the arm to partially rotate the shaft 4, to which it is keyed rigidly. Secured to this shaft, inside of the selector box or case, are a number of short arms 26—one for each indicator operated—each of which is connected with its respective indicator by means of the following parts: Link 17, three-armed crank 16, jaw 18, and rod 19. Each of the three-armed cranks 16 is pivoted at the extremity of its centre arm to swinghook 15, which is in turn pivoted on a fixed centre, and is so arranged as to normally become engaged with a corresponding hook 14, operated by motion of the armature 9 of the magnet 8, when the magnet is charged; but which is free to swing up out of its position of engagement with the hook 14 when the magnet is demagnetized and the arm 5 is depressed by motion of the signal.

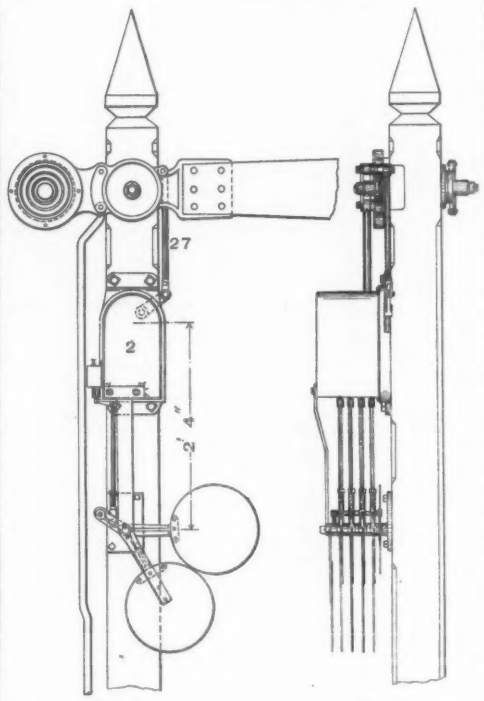


Fig. 3. Fig. 4.
Semaphore with Electric Selector.

When the arm 5 is depressed and the links 17 are all propelled to the left in consequence, the natural tendency is to swing the cranks 16 up on their pivotal connections, with the jaws 18 as a centre, and to elevate the outer ends of the hooks 15 thereby, thus absorbing the motion and imparting none to the rods 19. But should one of the magnets 8 be charged, and should one of the hooks 14 be made to engage with the hook of the corresponding arm 15 in consequence, the swinging up of that arm 15 would be prevented, and the motion of the crank 16 would be expended in depressing that one of the rods 19 to which it is connected, and that indicator to which it is attached would become elevated into view from its obscure position behind the screen. In returning to its normal position (as shown) the action of the several parts is such that the armatures of each pair of magnets are forced positively away from the poles of the magnets, thus preventing all danger from residual magnetism and making the device act with great certainty.

Fig. 5 shows another form, operated on a similar principle, for use on dwarf semaphores, and the method of attaching it to such a signal is shown in figs. 7 and 8. Fig. 6 is a side view, partly in section, of the box shown in fig. 5. The manner attaching to the semaphore post is shown at the right of fig. 6.

In fig. 5 *E* is an electro-magnet and *A* as the armature thereof controlling the movement of the locking arm *B*. The vertical rod *R* is connected with the disc which indicates the track for which the switch is set. As will be seen by figs. 6 and 8, there are as many of these magnets, levers and rods in each box as there are indicators, and

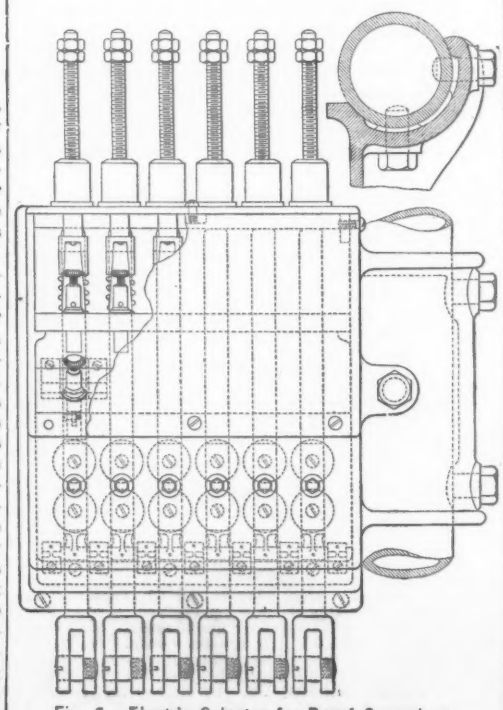


Fig. 6.—Electric Selector for Dwarf Semaphore

the operator selects the indicator by closing the electric circuit through the proper electro-magnet in each case.

Normally every clearing of the signal pulls down lever *B* (see fig. 7) and has no other effect, so far as the indicator is concerned, the fulcrum being at *C*. All the rods *R* (fig. 5) are then pulled down, but produce no movement of the indicator disc *H* (fig. 7). For the disc that it is intended to display the operator closes the electric circuit, locks rod *R* by means of the arm *B* and thus prevents the joint *D* from moving. *D* then becomes a fulcrum for that particular indicator and the depression of *B* lifts *C*.

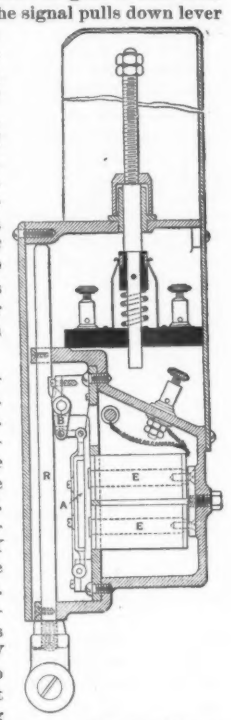


Fig. 5.—Electric Selector for Dwarf Semaphore.

G, fig. 7, shows the air cylinder for operating the signal. This is shown in detail in fig. 9, in which *E* is the electro-magnet, *A* armature of the same, *S* the air supply, *B* the air passage to the cylinder *C*. *P* is the piston, *S* the rod connecting same with signal, *X* the exhaust passage, *U* the upper valve and *L* the lower. The closing of the electric circuit by the operator attracts armature *A*, closes valve *U* and opens *L*, admitting air to the cylinder and pushing out the piston, thereby lifting the counterweight *W* and rod *A* (fig. 7), placing the blade in the clear position. On the opening of the circuit, either by design or accidentally, the valves are lifted by the

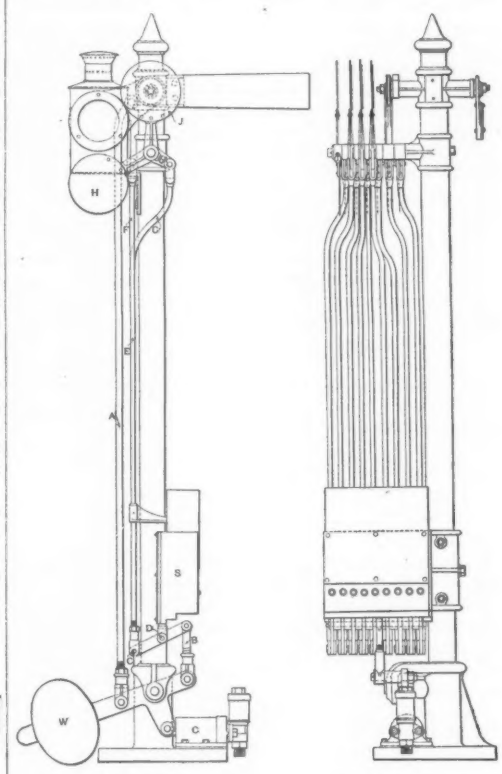


Fig. 7. Fig. 8.
Dwarf Semaphore with Electric Selector.

spiral spring beneath *L*, allowing the air to escape through *X* and the counterweight to pull the signal to danger.

American Society of Mechanical Engineers—Richmond Meeting.

The first session of the annual meeting of the American Society of Mechanical Engineers was held at Richmond, Va., Nov. 11. The visiting members and their guests, numbering about 300, were welcomed by Hon. J. Taylor Ellyson, Mayor of the city, who was introduced by Mr. E. F. C. Davis, Chairman of the local committee. The Mayor, in briefly reviewing the history of the capital of the Old Dominion, spoke of the changed conditions which had led to the establishment of over 700 manufactories, employing 25,000 hands, nearly 25 per cent. of the population, which he believed to be a justification of the wisdom of the selection of Richmond as their present meeting place.

After a response to the Mayor's words of welcome, Mr. Oberlin Smith, President of the Society, delivered his annual address, his subject being "The Engineer as a Scholar and a Gentleman." Tracing the evolution of the engineer in his career as a molder of the greatest triumphs of civilization, he pointed out that the exac-

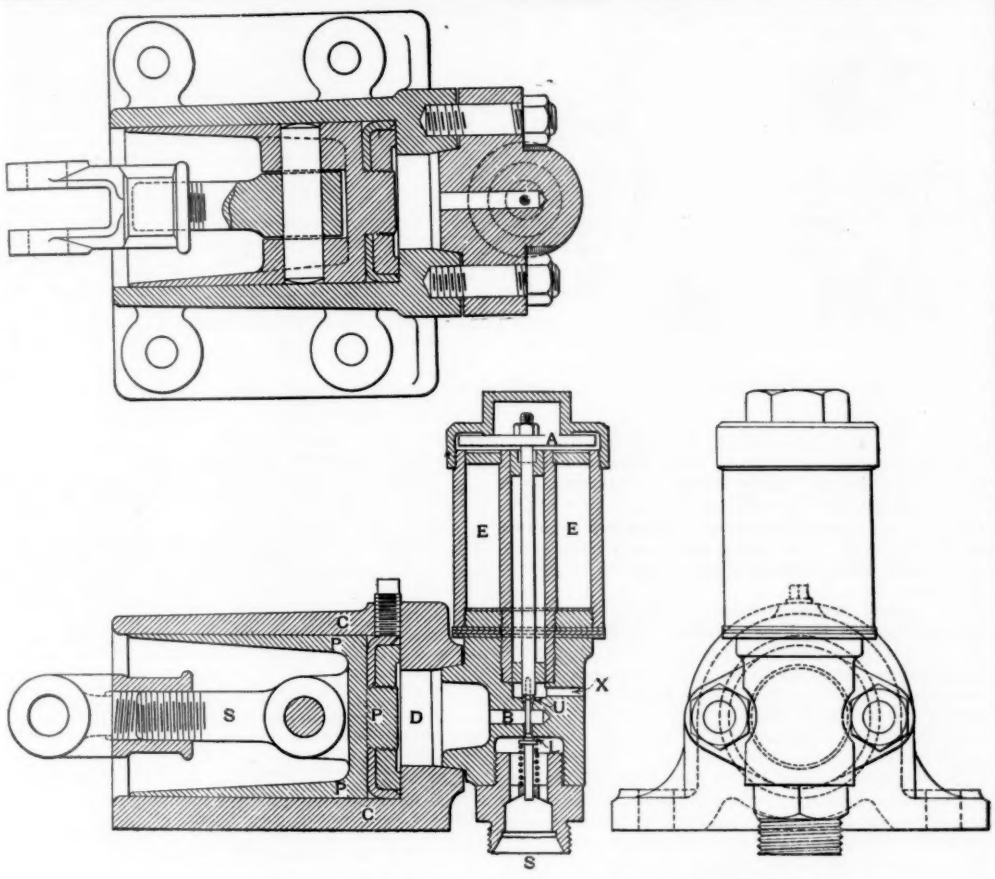


Fig. 9.—Pneumatic Cylinder and Electric Valve for Dwarf Semaphore.

tions of science to-day require thorough technical training, and that still more attention should be paid to literature. He also believed that the civil schools might well follow the examples of the naval and military academies in devoting more care to the social features of life. He also suggested that engineers of the various classifications should be so federated as to exert an influence in the direction of higher standards of membership. At the conclusion of the President's address the meeting adjourned until Wednesday morning.

In the evening the members of the Society and the ladies accompanying were received by Governor and Mrs. McKenney.

The second session of the meeting was held Wednesday morning, Nov. 12. The annual reports of the Council and the Library Association were read by the secretary. The result of the election of officers was announced by the tellers as follows: *President*, R. W. Hunt; *Vice-Presidents*, S. W. Baldwin, J. F. Bankhurst, and Alexander Gordon; *Treasurer*, W. H. Wiley; *Managers*, Andrew Fletcher, W. R. Warner and Coleman Sellers, Jr.

The printed report of a discussion was then taken up "On a Standard Method of Conducting Duty Trials of Pumping Engines." The criticisms of various engineers upon the report of the Committee had been received during the year. The proposition to substitute a duty unit of "1,000,000 heat units" for the old "100 lbs. of coal" was generally approved, because of the widely varying qualities of coal used and the occasional use of other fuel, such as wood, petroleum, etc.

Prof. Denton considered the report one of the best examples of committee work he had ever seen. The thermal unit and not the water consumption is the true basis for measuring the exact efficiency of a steam plant. The various other systems of testing had been examined and referred to, but the use of the pump as its own meter was evidently the most satisfactory. He believed that Porter's steam tables should be accepted not only for their admitted accuracy, but as among the highest American contributions to science.

Mr. Hawkins believed that the reduction of the duration of a test from 24 to 10 hours was a mistake.

The report of the committee was finally accepted.

An amendment to the rules was submitted for action in 1891 by which the Nominating Committee was instructed to submit the names of two candidates for each vacancy instead of one as heretofore; also that any five members in good standing may organize as an independent nominating committee.

The report was presented of the joint conference of the representatives of engineering societies upon an International Engineering Congress at the Columbian Exposition in 1893. Mr. Jesse M. Smith, who attended the conference, reported that it was not the intention that any action there taken should be binding upon the societies represented. It is the intention, however, that hereafter the delegates appointed shall have full power to act. The report was accepted and the delegates will be appointed by Council.

Mr. W. H. Adams presented a paper on "An Engineering Problem at Richmond, Va.," which embraced a plan for the general utilization of the water power of James River. After the adjournment of the morning session the members were given an excursion upon the river, which enabled them to appreciate the various points brought out by the paper.

Reports of Broken Couplers.

The following is the blank form for "Report of Repairs and Renewals of M. C. B. Automatic Couplers" which has within a few months been sent out by the Baltimore & Ohio:

A form is also sent out for similar reports of malleable iron drawbars. This is precisely like the one above except that the diagram shows three views of the malleable drawbar, instead of the M. C. B. coupler.

Reports of this kind are collected by several other roads, but they are still something of a novelty. It will not be long now, however, before such reports will furnish a most valuable mass of data concerning the life of couplers.

The Improvement of the Muscle Shoals of the Tennessee River.

The Tennessee, which Major McFarland of the U. S. Engineer Corps says is a larger river than the Ohio, averaging broader and deeper, is 808 miles long from Kingsport, at the junction of the North Fork of the Holston with the Holston, to its mouth at Paducah, 50 miles above Cairo. From Kingsport to Knoxville, 150 miles, the river is only navigated by flat boats, etc., and from Knoxville to Chattanooga, some 200 miles, steamboat navigation depends on the stage of water; but from Chattanooga down to Paducah there would be fair navigation if it were not for the Muscle Shoals, 38 miles long, between Brown's Ferry and Florence, which is 255 miles from the Ohio, at Paducah. This obstruction, which has a fall of 134 ft., renders 360 miles of navigation above unavailable for anything but local traffic, and has been effective in retarding the improvement of both the 150 miles of the main river above Knoxville and some 300 miles of improvable tributaries in the French Broad, the Hiawassee and the Clinch; or, in other words, has tied up a possible navigation of over 1,100 miles in extent in the main river and tributaries.

The improvement of the Muscle Shoals, which is now completed by the building of locks, dams and 28 miles of canal and aqueduct, is historic. In 1824 John C. Calhoun, the Secretary of the Treasury, called attention to its necessity, and in 1827 the general government gave the States interested a land grant, by the aid of which a canal was completed in 1838, but the improvement was of insufficient length. Though boats could pass through it, they could only reach it in favorable stages of the waters, and its use was soon abandoned.

From that time until 1871 government appropriated only about $53,000 for the whole river. But from 1871 until now $3,112,500 has been appropriated toward a total estimate of $5,056,000 for the improvement of the river below Chattanooga. It will be noticed that this expenditure has been stretched out over nearly 20 years, and the interest account compounded semi-annually at 5 per cent. per annum amounts to $2,145,300, or about two-thirds of the cost. If the deterioration of plant by decay and the loss consequent on the uncertainty of appropriations is added to the interest account, the aggregate of the direct losses from delay will probably amount to fully one-half of the cost of the improvement up to this time. And this has been a dead loss; for, with the exception of one cargo boat that passed through the

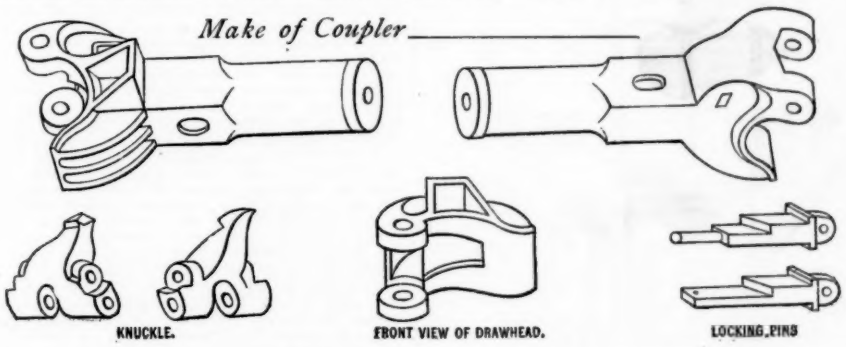
On the_____day of_____, 189—, at_____Station

_____

Master Mechanic.

Illustrate location of breakage by red ink lines over printed outlines below, using one sheet for each Coupler.

*Make of Coupler*_____



CAR.		Description and Cause of Breakage.	Disposition of Broken Parts.
Initials,			
Number,			
Class,			

Broken Automatic Couplers of this type must be forwarded to Superintendent Motive Power, Mt. Clare, Baltimore, Md., if broken on lines east of the Ohio River; or, if broken on lines west of the Ohio River, to Superintendent Motive Power, Newark, O., and must be securely tagged, showing from what car removed and by whom sent. Copy of this report must also be forwarded to Superintendent Motive Power as specified above, and in all cases to Master Car Builder, Baltimore, Md.

To { *Sup't M. P.* _____ *and* *M. C. B.* _____

E. W. GRIEVES,
Master Car Builder.

Approved, J. T. ODELL,
General Manager.

canal about a year ago, the improvement during the 20 years it has been prosecuted has been of no use to those living on nearly 900 miles of stream above it.

The Germans, a much poorer nation than ourselves, manage internal improvements very differently. In 1883 they commenced the improvement of the Main from Frankfort to the Rhine, and though there was a scant 6 ft. of available water below the mouth of the Main, they decided on a depth of 8¼ ft. in the locks, instead of only 6 as for the Tennessee, and completed the improvement of the 22 miles in three years and a half, at a cost of $1,833,144 for money appropriated, and less than 10 per cent. on that sum for interest; whereas our expenditure for interest has been nearly 69 per cent. on the money appropriated. The sum so far expended will, it is hoped, immediately lead to the development of the whole length of the river, which, while not as long as the Ohio, is rich in natural resources. The improvement of the Main resulted in increasing the river traffic by 1888 to seventy-three fold what it was on a three-foot navigation, and at the same time there was an increase of 36 per cent. in the railroad traffic, so that it was determined last year to increase the length of the locks to 1,165 ft. each, to enable two trains of four large boats each to be locked through at one time.

Whether the traffic on the Tennessee shows such an increase or no, the development on its banks has been unnecessarily delayed for 15 years through the small and intermittent appropriations made by Congress.

Brown's Spark Arrester.

The novel smoke stack shown in the cuts was invented by Mr. P. J. Brown, and has been adopted by the Texas & Pacific as a standard. It is of the old diamond type, with a netting area of 71 sq. ft., the netting being formed in a balloon shape and made 4 in. smaller than the inside diameter of the top of the stack. In this way it is claimed that a greater opening is obtained for the draft than from any other design, and at the same time sparks are prevented from passing through.

It has been in use two years on the Atlantic & Pacific Railroad, and is now running on 40 engines with satisfactory results. The first few put on gave a little trouble on account of the gas from the cinder pipe, that pipe being then placed under the ash pan, and a little spray of steam and water was used to put out the fire. Since it was changed to run into the ash pan all trouble from gas has been removed. The gas is now drawn through the grates, and the cinders are deposited in the pan; to remove them a blower valve is used, which is coupled to three pipes in the bottom of the pan. It is but little trouble to do this. Now that the pipe is run into the pan, the steam and water jet referred to is not used.

The Master Mechanic of the Atlantic & Pacific, Mr. G. A. Hancock, writes: "It is the best appliance I have seen for the purpose. The engine steams well, and throws very little fire with the coal used. With Eastern coal no sparks would escape. Coal used on the Atlantic & Pacific will not coke, but burns the same as wood." He further says that the Texas & Pacific has adopted this stack to reduce the loss of cotton from fires set by

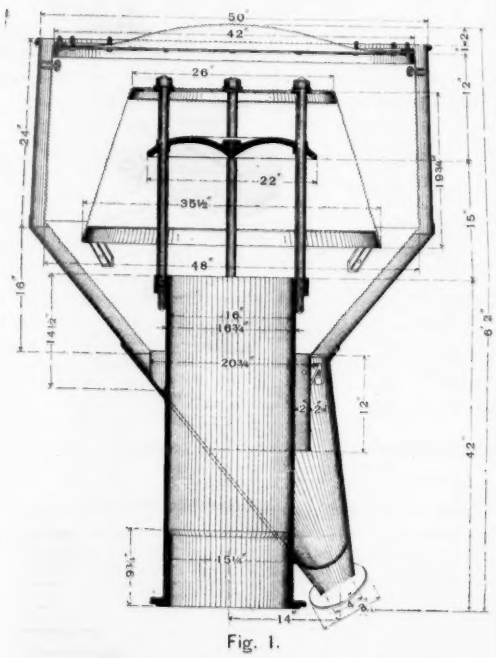


Fig. 1.

locomotives using other forms of spark arresters. A saving in fuel is made also.

The netting used varies with the coal burned from 6 × 6 No. 16 wire with good coal to the 4 × 4 No. 11 wire used on the Atlantic & Pacific on account of the water being very bad, which causes foaming, and the considerable moisture in the stack with the coal causes the netting to clog if a finer mesh is used than the one mentioned. The main barrel of the stack, as seen from fig. 1, is made of cast iron, and the large funnel-shaped spout on the side is arranged so that when cinders are driven by the cone

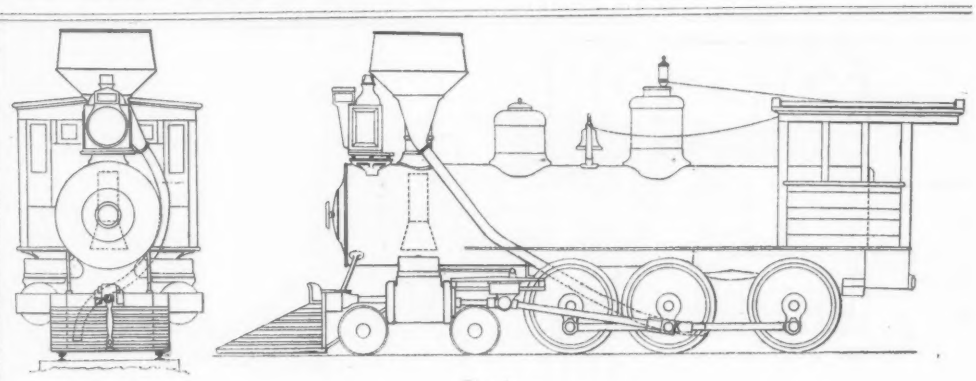


Fig. 2.

BROWN'S PATENT SMOKE STACK AND SPARK ARRESTER.

through the side of the netting they fall into the 2-in. open space outside of the stack, where they are entirely away from the action of the exhaust. From this space the cinders fall into the funnel at the side of the stack, from which a pipe conveys them to the ash pan, as shown on the elevations of the locomotive, fig. 2. This stack can be used on locomotives with or without the extension front.

The Acting Superintendent of Motive Power and Rolling Stock of the Texas & Pacific, Mr. M. W. Elliott, writes that the locomotives equipped with this stack throw no fire, and their steaming qualities are excellent; also that it avoids the troubles incident to smoke box extensions, such as the burning out of the front ends, leaky steam pipe joints, and loosening of the cylinders where attached to the smoke box.

The illustrations show clearly how this stack is applied and the method of conveying the sparks to the ash pan. The cone in the stacks against which the sparks first strike is made of cast iron, and held in position by four rods with pipe thimbles, as shown. The ends of the rods screw into the smoke stack barrel extension at the bottom with the key beneath the lug thereon, and the inverted cone of netting is secured to the top of these rods by means of nuts. The cone is stayed in position by angle iron braces, as shown in fig. 1. The other features of the construction are too clearly shown to require further description. This stack is of particular interest because of its success in a country where there is a great yearly loss in cotton from fires set by locomotives.

Making and Maintaining Rates.

The events of the past year have strengthened the belief that no satisfactory solution of the rate problem can be reached except through a much more thorough unification of interests than has yet been realized or attempted, involving necessarily a very substantial surrender of individual authority.

The practical points are two—the establishment of rates and the maintenance of rates. These are separate matters and should be so treated.

A chief difficulty with present methods lies in the fact that no separation is attempted. In case rates are not maintained, the pressure of a reduction is applied with the purpose of enforcing the maintenance of tariffs by the use of reduced rates as punitory process. The evil results of this custom are many, one of the more obvious being that each reduced rate erects a standard of comparison, soon becoming a permanent condition, and each succeeding annual report discloses constant reductions in the rate per ton per mile which the narrow margins of to-day compel the careful observer to regard with great apprehension.

Relief from this danger requires *the severance of rate making from rate maintaining.* . . . I am thoroughly convinced that the roads should discard independent action in initiating competitive rates; should relieve their traffic departments from the responsibility of making rates, and should put the whole subject of their establishment in the hands of a central agency responsible directly to the presidents and directors of the associated lines. In other words, I believe that the several Boards of Directors should reassume the duties in this respect which they have allowed to drift into the hands of their general freight and passenger agents and rate clerks, and by concurrent action should place the exercise of this important function in the administrative control of *a small General Rate Committee,* . . . and subject only to supervision by the various Boards of Directors. . . . Unless something of this kind is done railroad managers will presently be chiefly receivers.

The *maintenance* of rates presents a much more difficult question. Its inherent difficulties are aggravated at the present time by legislation which, while it forbids rate cutting, in fact fosters it. Railroads are business enterprizes which properly expect reasonable profits. In order to secure them they must have work to do. The public does not interest itself to make an equitable apportionment of its patronage. . . . No one has yet suggested a way in which railroad rates can be maintained, and unjust discrimination controlled, without providing some form of compensation for cases where necessity demands it. The way in which this has been heretofore effected throughout the world, where railroad competition is permitted to exist, is by a pooling of earnings. This the law forbids.

The most certain method of escape from the net in which the roads are thus enmeshed would be to physically terminate competition. Consolidations might be made which would presently reduce our country to the condition of France, with its six non-competitive railroad companies, each exclusive in its territorial field. This is not what the public expects or desires. The course has been entered upon, however, and progress would be rapid but for the peculiar difficulties in the way of each individual transaction.

Meanwhile the division of the traffic itself has been suggested as a basis upon which rates may be maintained; its feasibility is as yet experimental, but it seems to be the last resource; it offers a fair expectation of present though perhaps temporary relief.

I am still of the opinion that it would be well for the roads to seriously consider the question of placing their entire joint traffic to and from their eastern connections in charge of a common agency. . . . Very little, if any, change would be required in the methods now employed, except the discontinuance of line solicitation; enormous expenses could be lopped off; and a block of readily divisible traffic would be created, ample for the purpose of equalization, and easily protected against outside competition.

The roads have not forgotten that a few months ago a new association agreement was prepared, to the acceptance of every line, in which a general organization under the name of the Western Associated Railways was provided for, and methods of transacting business were arranged which was considered to be improvements upon the present in many ways. This plan remains still in abeyance, and may be taken up at any time.

The proposed agreement is confessedly weak in two respects: First, in leaving to the lines the right of independent rate-making; second, in failing to provide an adequate basis for the maintenance of rates. Perhaps the present is a favorable opportunity for attempting the treatment of these important subjects.

ALDACE F. WALKER.

Private Cars Built by the St. Charles Car. Co.

Two very beautiful private cars, the "Nomad" and the "Sierra Mojada" have been built by this company. The "Nomad" was ordered by the Rio Grande Western and the "Sierra Mojada" by the Monterey & Mexican Gulf. The interior of the "Sierra Mojada" (which is 66 ft. long) is arranged with an observation room at each end of the car, with beautifully upholstered easy chairs, pier mirrors and velour drapery. Adjoining one of the observation rooms are two private rooms, finished in prima vera and luxuriously upholstered and draped in old red plush and velour. The four sections in the centre of the car are upholstered in blue plush; adjoining are the lavatory, heater room, pantry, kitchen and lockers for crockery, glass and silverware, and hot and cold water. The lighting of the cars is by the Frost carburetor system. An extra amount of storage room is provided for the purpose of making long journeys into the interior of Mexico, where Northern delicacies and conveniences are not obtainable. The car "Nomad," which is 65 ft. long over body, is arranged with a large observation room, fitted with one large extension table, a sofa which can be made up into a bed, pier mirrors and handsome, rich silk drapery, which harmonizes excellently with French oak finish, which is used throughout the car. The sections, which are furnished with upper berths of the latest pattern, are finely fitted with drapery and hangings to conform to the observation room. Through the opening of the section bulkhead, which is neatly draped with a portierre, a corridor is reached which extends along the side of the car. The entrance to the large private room is from this corridor. The interior of the room contains rich upholstery and is furnished with a large sofa, which can be made up into a bed, and there is an upper berth above it. In one corner, near the side of the car, is a lavatory and wardrobe with pier mirrors from top to bottom in the door. Adjoining is a large bath room with closet, finely furnished with every convenience for its purpose. Stepping out of this bath room into the corridor the next door opens into a smaller private room, adjoining which is another private room of the same size. The partition between these two rooms is made to slide up or down, enabling the occupants to turn the two rooms into one as may be desired. These rooms are furnished in upholstery and drapery like the others but are each especially provided with hot and cold water lavatories. Immediately adjoining these rooms is a second bath room furnished with bath arrangements, hot and cold water douche, house-closet and lavatory in the most complete manner. A diagonal passageway leads from this bath room to the side of the car. The heater room, linen and other lockers are placed on the left side and on the right the pantry and kitchen, furnished with hot and cold water tanks, refrigerators, lockers, cupboards, and other improvements. A commodious servants' room between the kitchen and the end of the car, with sofa and upper berth, lavatory and water cooler, completes the interior. The platforms are very spacious, and that at the servants' room end of the car holds a vegetable refrigerator while the one at the observation room end of the car is provided with an awning, supported by four adjustable posts. The latter can easily be taken down and carried in a locker near the heater room. Both platforms are inclosed by gates and railings, covered by mahogany. This car is equipped throughout with the water pressure arrangement for both hot and cold water. It is illuminated by the Pintsch gas system, and is ventilated by the No. 1 Creamer and automatic reversing ventilator system.

The Wenstrom Dynamo & Motor Co.

When Chadbourne, Hazelton & Co., of Philadelphia, took the agency for the Wenstrom Consolidated Dynamo & Motor Co., last June, it was the intention of that company to equip its old factory at Locust Point, Baltimore, with new machinery. The company determined later to build a new factory, and purchased 100 acres of land and commenced operations. The completion of the new factory has been delayed and the company is entirely unable with its own facilities to fill the present orders

for the Wenstrom apparatus. The directors have decided to rent a larger factory in Baltimore already equipped with boilers, engines and shafting. The new factory is 60 ft. × 200 ft., three stories high, and will be in working order by the last of this month. It is then expected to turn out enough machines by working day and night to fill most of the orders. The large new factory at Calverton will be ready for operation by the early spring. It will be almost entirely devoted to the manufacture of street railroad apparatus.

The Present Uses of Aluminum.

What follows is from a recent letter from the proprietors of the Pittsburgh Reduction Works: At present most of our aluminum is used for fancy articles, to take the place of German silver and plated brass for plaques, match boxes, clock cases and a thousand-and-one articles of a like nature. Some of it is also used as receptacles to hold acidulated waters; the metal being entirely unattacked by either nitric or sulphuric acids. Respecting household ware of aluminum, the Avery Stamping Co. have made up some lines of these goods and have talked about going into it quite extensively. How soon this will be we cannot say. We have to add, however, that at the last meeting of the American Institute of Mining Engineers, at Washington, the use of aluminum for household utensils, in place of tinned copper and granite ware, was extensively discussed, and the general verdict was that aluminum was by far preferable for this purpose, for, unlike other metals, it is not attacked by acid and contains no poisonous ingredients deleterious to health. In fact, several gentlemen stated the interesting fact that a large percentage of the ills of the human system that were attributed to other causes were due to nothing more than the antimony, arsenical, cuprous and other poisonous salts that go into the foods from the vessels used in cooking. We have no doubt that it is only a matter of a short time when aluminum will be very extensively used for cooking purposes.

THE SCRAP HEAP.

Notes.

The C. J. Wells elevator in Buffalo was burned on the night of Nov. 5. Loss $250,000.

H. Walter Webb, Vice-President of the Wagner Palace Car Company, has brought suit against the New York, Lake Erie & Western for using Pullman cars equipped with Hien's platform and Browning's buffer, the patents for which were assigned to Webb.

The Lake Shore & Michigan Southern has adopted a new schedule of rates and conditions with its engineers and firemen, by which the freight men receive an increase of wages averaging 20 cents per day. The engineers will now receive about $3.70 and the firemen about $1.85.

The Central of Georgia is making a new contract with its locomotive engineers, by which it will adopt mileage rates instead of paying by the day as heretofore. The provision that a candidate for appointment shall be examined by a committee on which a representative of the Brotherhood sits will be abolished.

The General Grievance Committee of the locomotive engineers, firemen, trainmen, switchmen and conductors of the Pennsylvania lines west of Pittsburgh, about 100 men, are in Pittsburg, to present a new schedule of wages to General Manager Wood, and to ask the investigation of complaints against certain division officials.

The Grievance Committee of the Brotherhood of Railroad Brakemen of the Lehigh Valley called on General Eastern Superintendent Goodwin this week with certain grievances they wished to have remedied, but Mr. Goodwin, when informed by the committee of their being members of the Brotherhood, refused to receive them as members thereof, and told them that had they come as employés of the road he would listen to their grievances. He told them, however, that he would bring the matter of their having called on him before the Board of Directors, and the action of the body would be communicated to the committee.

The Nickel Mines of Canada.

A correspondent talked with several members of the Iron and Steel Institute while they were in Canada about their visit to the Sudbury nickel mines. Referring to this visit, Mr. Charles D. Phillips, of the South Wales Institute of Engineers and the Emlyn Engineering Works, Newport, England, said: "The mines at Sudbury were to us a perfect marvel. Such mines of nickel in its natural state we had never seen. There must have been at least 50,000 tons in the calcining kilns and as much more in the mattes. There is a great future for nickel. It will add greatly to the toughness of steel. When a cannon ball strikes an iron plate it cracks it, as well as making a hole, while with nickel it would go right through, making a round hole, which would give better chances of repairs. Of course, it would be more expensive; but with a government expense is, of course, a secondary consideration. No export duty should be put on nickel. It should have free vent." Mr. Richard Saybourne, C. E., of the Isca Foundry, Newport, said that if nickel could be reduced economically there were magnificent possibilities to it. With it steel would be enormously strengthened, and it would undoubtedly be largely used for armor plate. This strengthening of steel would enable suspension bridges to be built of wider spans. In his opinion the supply of nickel at Sudbury was practically inexhaustible. They saw specimens of ore which contained, they were told, as high as 10 per cent. of nickel. Asked what he thought of a proposal to place an export duty on it, Mr. Saybourne replied, emphatically, "It would be a failure." Mr. Jeans, the Secretary of the Institution, was very much impressed, he said, as were all the party, with the vast deposits of nickel as Sudbuyr. He said. "The best answer you can get to the question, What do we think of the Sudbury nickel? is the fact that many of our members are talking of investing in it." Professor Bell, who has given special attention to the development of the mineral deposits at Sudbury, explained to the delegates the great resources and mineral wealth of the Sudbury district. The main industry, he said, at present is in nickel and copper, of which there are now five mines in operation, chiefly worked for nickel. The mines were first opened for copper, and it was not till long afterwards that the existence of nickel was discovered. The nickel and copper are mixed in the same vein, and are only separated by smelting. This is the case in all five mines. The copper is the largest percentage, but the nickel, while less plentiful, is the most valuable. Sometimes, though, the nickel is found in larger quantities than the copper, but that is an exception. The copper generally mines 10 per cent. and the nickel five per cent., but by smelting the proportions are usually trebled. The copper and nickel deposits cover an immense extent of territory from Lake Superior to Lake Mistassini, from which points run the Huronian or coppor-bearing rocks. Nickel has not been looked for elsewhere than at the present mines, but it is possible it exists all along with the copper.

How to Get Good Machinists.

Master mechanics bewail the fact that "machinists ain't what they used to be." Motive power officials are themselves wholly at fault for the lack of good railroad mechanics and for the hordes of useless ones. Good mechanics are in constant demand. First-class machinists are worth $3.50 and blacksmiths $4 per day—yet there is no supply for the demand. Botch workmen are plenty, and dear at any price. In order to make first-class mechanics it is necessary to have, as seed, apprentices of intelligence, with common school educations, a taste for mechanics and an ambition to become proficient in the business. The very youths who would make bright and useful mechanics are shut out from a field of usefulness that they would honor and adorn—for what?

To give room for boys who go into the shops for the bare wages in sight or because they are forced there by their fathers, who are in the service or have some influence with the powers that be.

Mickey Doyle is the oldest wiper on the road, hasn't missed a day for nine years, he wants to get his boy Dennis doing something to help support him, as he won't go to school, so he makes application early and the boy is worked in as helper, serves three years as an apprentice—just as he would serve three years as a prisoner—and turns out as a machinist; he don't go to work as a journeyman in the shop. No, the foreman can't put on any full pay men just then; so he goes off, a finished mechanic, and the master mechanic is glad to be rid of him.

If possible, Dennis is got on the road firing—pays more on the start—he is given a job cleaning ashpans or wiping, the foreman mentally declaring that he knows enough for that, and that's about all; but a rush occurs, and the first available man is pressed into the service, so Dennis gets to be smoke shoveler, and, as the agreement with the men says seniority is the proper qualification for promotion, Dennis gets an engine in his turn. One more plug engineer added to the list of bad ones, and another young man, who would have made a good one, forced to drive a horse car, tend bar or go into politics. . . . It would take some work, a little thought, and a departure from precedent to choose apprentices for all positions upon the merits of each case, to give intelligence, natural aptitude and decency preference over cousinship, friendship, politics, religion or boodle. . . . We have no patience with that class of pessimists who are constantly declaring that good bright boys do not want to learn trades. Once announce that you will put to work only intelligent young men who have gone through the public schools, and who themselves desire to learn the trade, and who will, after six months' trial, satisfy you of their adaptability, and desire to become mechanics, and that they will be promoted on merit, and you will be overrun with applications, and can pick out the future mechanics of your road from the cream of the land.—*Locomotive Engineer.*

Bureaus of the Interstate Commerce Commission.

Secretary Mosley, of the Interstate Commerce Commission, announces that the bureau in charge of the Auditor will hereafter be known as the Bureau of Rates and Transportation, Auditor C. C. McCain remaining at the head thereof. In view of the importance of providing for an exhaustive compilation of statistics from the annual reports of carriers, and the great amount of detail work involved, a Bureau of Statistics has been established, which is in charge of Prof. Henry C. Adams, statistician.

The Canadian Steamship Line.

It is now stated in official circles at Ottawa that the Dominion government will award the contract for the Atlantic fast mail service to the Hartington syndicate, which was represented by Mr. Bryce Douglas, of the Naval Construction and Armaments Co., of Barrow-on-Furness, England. The signing of the contract is contingent upon the acceptance by the tenderers of certain modifications in their offer which the Canadian government has suggested. The proposal to call at a French port is adhered to, and meets with the approval of the tenderers.

Percentages of Different Kinds of Deadheads.

On a certain railroad in Texas there were issued in one year 1,000 time passes, 3,000 annual passes, 3,000 complimentary trip passes and 5,000 employés passes. This is a comparatively small road.—*Exchange.*

A correspondent, who may possibly be slightly warped by prejudice, thinks that on an average 1,000-mile road the facts, presented in tabular form, would be about as follows:

	Persons, No.	Persons, P. c.	Miles per trip.	Miles per capita yearly.*	P. c.
1,000 time passes.....	1,000	07	50	5,200	2
3,000 annuals.....	5,000	33	1,000	313,000	97
3,000 comp. trip.....	3,500	24	2,000	4,000	1
5,000 employés trip..	5,500	37	50	200	—
12,000	15,000	100	3,100	322,400	100

*Deduced from preceding column.

Efficiency of Car Service Associations.

At the present time there is a great shortage of freight cars in nearly all sections of the country. This is no new thing. For several years past the demand for cars in the fall months has been in excess of the supply. This fact, when placed alongside of the fact that the general average car movement is only 23.13 miles per day, presents a peculiar condition of affairs. . . . Earnest efforts have been put forth during the last three years to improve matters, but "car service" (demurrage) is a force, and this force is at work. In view of the fact that the statistics published by the Time Convention were collected with the alleged purpose of showing to what extent the operations of the car service associations have increased the car movement, and that, if anything, a decrease is shown, it might be doubted whether the new force will prove so effective as claimed. . . . We said last March: "The purpose of the committee, to find out what effect, if any, the operations of car service associations are producing in the way of increased car movement, is an excellent one, but it is doubtful that the returns will show any marked improvement in the average performance of cars as compared with statistics formerly collected. We believe, however, that the statistics when compiled will demonstrate that the necessity for the introduction and extension of the reform measures in handling freight cars is still about as great as before the first car service association was organized."

Other factors have exerted a greater influence upon car movement than have the car service associations. More new cars have been built during the interval between the collection of the statistics than during any other period of the past eight years, and the increase of cars as compared with the increase of tonnage has also been greater; and during this interval the 60,000-lb. capacity car has practically superseded the 40,000-lb. and less capacity car, resulting in the movement of greater tonnage with less car miles. The general average movement per car per day will never be increased so long as the aggregate increase in the number of cars keeps pace with the aggregate increase in the volume of tonnage to be moved—making allowances, of course, for increased car capacity. Bearing these facts in mind, the Time Convention statistics cannot be construed to show anything against the efficiency of the car service plan.

Twenty-two car service associations handled during May, June and July 1,220,382 cars, on which the average detention was 1.64 days per car, or a general average reduction of 67 per cent. in detention as compared with months immediately preceding the inauguration of the car service rules. These figures prove that the car service rules are a real and energetic force, and when applied will prevent undue detention of cars under load. With this reform accomplished throughout the country, the regulation of the car supply with reference to the legitimate needs of trade will have become a comparatively easy matter. If cars are unloaded promptly, the moving of the empties to loading points will naturally follow. A more abundant supply of empties at loading points will curtail the building of new cars. Not more cars but more movement of cars is the necessity of the day, and the extension of the car service plan will surely bring about this result.—*Equipment Guide.*

From a Publication devoted to an Exact Science

General Passenger Agent Daniels, of the New York Central & Hudson River, has a beautiful collection of photographic scenes along the line of that road, the work of W. H. Jackson & Co., scenic photographers, of Denver, Col. The views are 50 or 60 in number, and some of them are 76 in. in length. They are mounted on card and canvas. One might easily and very pleasantly spend an entire day in observing them, and in imaginative wanderings along the American Rhine, viewing scene after scene of most marvelous and beautiful specimens of the handiwork of the Creator. Old Storm King, in all its majesty and grandeur, looks calmly down upon the placid waters of the Hudson, as they flow languidly by, kissing its feet in all of nature's tenderness. Long strips of beachy sand form a yellow fringe to its mighty cloak of swaying pines, and while its lofty summit eclipses the setting sun, the white sails of pleasure skiffs dot the waters, floating in a shadow of serene radiance. The eye rests also upon other scenes familiar to the patrons of the road—the famous Mohawk Valley, in its perfection of fertility, its miles of emerald foliage streaked here and there by blue rills, and crystal creeks flowing merrily on to the sea. So one might go on from scene to scene in a feeble endeavor to describe unrivaled beauties which have commanded the attention of the ablest descriptive writers our country has produced.—*The Official Guide.*

The Fall in Stocks.

The shrinkage in values of all kinds of securities, caused chiefly by the disturbances in England consequent upon wild English investments in the Argentine Republic, and by other causes wholly unconnected with railroad operation which has been going on for some time became pronounced last week, and the condition of the Wall street market has been at times almost a panic.

Many stocks have touched the lowest prices of the year during the past ten days, and many the lowest prices in years. Chicago, Burlington & Quincy is down to 86—far the lowest price in a dozen years, and to be compared with 111½, where it stood last May. Chicago, Milwaukee & St. Paul went down to 47½, against 70⅝ for the highest price of the year—the lowest quotation since 1879. Chicago, Rock Island & Pacific has fallen to 69 from the 98⅝ of last January—the lowest level touched since the panic of 1873. Chicago & Northwestern is down to 105 against 117 for last May—the lowest point reached since 1880. Illinois Central touched 86⅝ on Friday—a fall from 120 during this year, and the lowest price recorded since 1879. Atchison and New York & New England have also seen the lowest prices of the year during the week. Pennsylvania has fallen below par and New York Central has declined on extensive selling to 97—the lowest price since the depression of 1884. Michigan Central has recorded its lowest price of the year—86. C., C., C. & St. L. has been down to 58½. Erie has seen the lowest quotation in five years; Richmond Terminal the lowest in six years. Louisville & Nashville is down to 73¼ from 92½. Missouri Pacific went down to 65, Northern Pacific preferred to 62, and Union Pacific to 44—all recording the lowest prices of the year. Pullman Palace Car Co. has been as low as 168.

The Disuse of Scotch Pig.

This style of iron, which was a short time since in universal use in this country, as well as in all iron founding countries, as a softener, has lately lost its hold on this market, and is now being successfully attacked in Canadian markets. A late number of the *Colliery Guardian* calls attention to the decrease in exports of pig iron to this side, and the *Iron and Steel Trades Journal* says: "Advices from Canada show that the demand for Scotch iron has completely passed off, and unless something unforeseen arises that market seems wholly lost to us; buyers cabling that their wants are being met by a cheaper, and in some respects superior, quality of American iron." The *Coal and Iron Trades Review* adds to its discussion of the subject: "If it were not that Scotch pig is so useful for freightage purposes, it is doubtful whether the quantities sent to the United States would not dwindle to zero to-morrow, so far as legitimate demand is concerned."

Canal Enlargement.

The Dominion government, in pursuance of its policy with regard to the enlargement and deepening of the St. Lawrence Canal system to a 14 ft. draft, have called for tenders, to be received up to Dec. 3, for the construction of a lift lock, weirs, etc., at Morrisburg, Ont., and the deepening and enlargement of the Rapide Plat Canal. The work will be divided into three sections, each about a mile in length. It involves the expenditure of upwards of a million dollars. Plans and specifications can be seen after Nov. 19 at the office of the Secretary of Railways and Canals, Ottawa, and at the Resident Engineer's Office, Morrisburg, where printed forms of tender can be obtained.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The week just passed there has brought something approaching a panic in Wall street. There have been a serious stringency in the money market, a great decline in stocks and several failures. One gleam of humor has been introduced by a New York newspaper, which has brought Jay Gould forward as the man who will save the nation. He is said to have bought control of the Union Pacific and to propose to take the presidency of that road himself in place of that wicked man, Charles Francis Adams. Further, he is credited with a design to bring about harmony among the Western and Southwestern roads, and to stop rate-cutting and all the other bad practices, which are reducing net revenues and depressing values. It seems probable that there has been a considerable transfer of ownership of Union Pacific stock which *may* result in some change in the management. There are indications also that something may be done in the direction suggested in Mr. Walker's communication which appears on another page, but the public is a little shy of the idea that Mr. Gould inspires such a reform, or will lead in it.

The Trunk lines and their western connections have apparently settled the dressed beef war, which has so seriously depleted their revenues for the past six months. The tariff agreed upon for Nov. 24 is subject to arbitration before final acceptance, but the modification already accomplished—the reduction of the Grand Trunk's differential from three cents to two—is no doubt understood by all as about the right basis for the arbitrators to establish. The principal result of the war is that the Canadian Pacific got what it demanded, equality with the Grand Trunk. The former differential was granted to the Grand Trunk only, and a chief cause of the fight was the claim of the Canadian Pacific, when it began to ship from Chicago, to the same advantage. The *form* of the new settlement is rather peculiar. The tariff rate is, we understand, to be the same by all routes and the differential takes the form of a rebate; that is, the roads via Niagara pay the shippers for the use of their cars ¾ cent a mile, and those via Montreal 1 cent. The difference, 2½ mills on 2,000 miles, equals 2 cents per 100 lbs. on 25,000 lbs., the average shipment. This is rather clumsy, and will probably not work equitably without some friction. The restoration of rates on grain and other articles comes naturally with the close of navigation and the increase of business incident to the season. The directors of the Chicago Board of Trade have entered a formal protest against the increase in the rates on grain, basing their claims on the opinion of the Interstate Commerce Commission that 22 cents for wheat and 20 cents for corn are reasonable rates. They also protest against a higher rate on oats than on corn.

Two engineers and two firemen were killed at Rock Cut, N. Y., 3¼ miles south of Syracuse, last week, Monday, by a butting collision caused by a station operator rushing out of his office and turning a switch for the side track just as a passenger train reached it. The operator, Michael A. Clark, was under the impression that the switch was in the wrong position and needed to be set right, and his mistake caused the rapidly moving passenger train to strike a freight train standing on the siding, with the above result. Four other employés and a number of passengers were injured. This collision is notable as being one which an ordinary distant signal might not prevent, it being possible to turn the switch after the train has passed the distant signal. With interlocked levers in a a tower, switches are locked by the opening of an electro-magnet, which opening is effected by the presence of the train on the rails at any point between the distant signal and the switch, and this method is considerably used; but without stopping now to consider this device, which might be thought too costly for general use, we may well ask if there is no other remedy for such a blunder as this—being, as it is, of a class which doubtless every one familiar with yard work has seen illustrated. A distant signal is such a valuable safeguard, even if it were to fail to provide against a case like this, that there is no ground in this instance for relaxing the effort to put in as many of them as possible; but if we can place any dependence on the force of habit, it is proper to go further and depend upon the signal as a valuable safeguard even here. When an interlocked switch is set for the main track the signal may be either at caution or at safety. If it is at caution the train will be approaching under control; if it is in the other position the operator must change it before moving the switch, and when he starts to pull the signal to danger his thoughts should naturally take cognizance of the fact that he is working to set the switch for the siding instead of the main track. In any event the necessity of pulling two levers gives him additional time in which to come to his senses.

But in this particular case we are not sure how much dependence could have been placed upon the force of habit. The dispatch announcing Clark's arrest states that he is only 17 years old, and that he had been at Rock Cut only a week. It is true that boys of 17 are likely to be bright, and that many of them have had some experience in switch tending; and Clark cannot be condemned without a hearing; but the general sentiment that boys and young women are unfit for positions of this kind without much careful training is not based wholly on theorists' dreams or newspaper writers' fancies, but is plain common sense. The *Railway Service Gazette* asks why an operator should not be as carefully examined as to his general judgment and reliability as a locomotive runner, and the question is not so easily answered as at first sight might appear. It did not need this collision to show that operators possess indefinite powers for mischief, and roads which employ many boys should take more pains to learn the views of officers of lines which pursue a more conservative course. The least that can be said of the Rock Cut case is that the reports throw upon the road the duty of fully explaining why and how it hired Clark and what his training has been. The fact that the switch was a Wharton "safety" and that he, therefore, had to hold up the weighted lever during the passage of the wheels over the switch tends to prove inexperience or worse.

A consignee in Louisville has obtained a temporary injunction against the Car Service Association in that city, intending to make a test case on the demurrage question. Shippers in Cincinnati are also agitating their grievances in this line. Not long ago the grain dealers of Philadelphia complained because car loads of hay were allowed to stand longer than cars of grain. Just now the Baltimore coal dealers are demanding six days' free storage, instead of two, because grain dealers are allowed that long period. It is evident that local concessions to special interests are likely to often cause as much trouble as they cure, and transportation officers will find that to manage this business successfully they will need all the virtues and none of the vices of traffic officers. Discrimination between customers is as bad in $1 demurrage bills as in $100 freight bills; and, if unjust, it is as odious to the law. The demurrage question will sooner or later come before the Interstate Commerce Commission, and it behooves the railroads to have the true principle governing it not only well studied, but well fortified by examples from their practice which shall show that a charge of this kind is in accordance with good public policy and can be equitably assessed. To simply say that it has released many cars, has benefited consignees as well as the roads and has been generally beneficial may not be specific enough to satisfy the lawyers. The time for unrestricted experiment has already extended longer than was to have been expected. It is no doubt just to give free storage on some cars and not on others, on goods in some places and not in others, and on goods at some times and not at others; but the reasons for these assumptions should be much more clearly stated than they have yet been. If demurrage is charged because the yard room is valuable, be ready to prove the reasonableness of the rate on that ground. If because cars are scarce, provide a workable scheme for suspending the rules when cars are overabundant. If grain cars must be hurried back west while coal cars can stand six days, what answer is to be made to a jury which has been told that one car is as good as another? A uniform demurrage rate is perhaps good enough to begin with, but if the avowed or disguised exceptions to the rule are so numerous as to bury it out of sight in half the cases where it ought to apply, uniformity is likely to become an empty phrase.

The M. C. B. Coupler Lines.

The inventor of a very promising coupler of the Master Car Builders' type writes to suggest that the Association's committee which is investigating the matter of contour lines should not hold designers strictly to the M. C. B. lines. His letter is printed on another page and states his position very clearly. We shall not take the space here to recapitulate what Mr. Robert has so well said.

A comprehensive series of tests, such as he suggests, would, of course, be valuable if it could be carried out. Meanwhile, service tests of great variety and extent are going on and data are fast being accumulated. The weaknesses of the several couplers are being well demonstrated, and the records are becoming every day more complete and scientific and more extensive. Several roads have already gathered much information by the method of marked diagrams more or less closely subdivided in classification, and in general like the diagrams used by the McConway & Torley company, specimens of which were published last week. The method of collecting this information on the B. & O. is shown in this issue. Other companies, the C., B. &. Q. for example, photograph all broken couplers and knuckles, as was shown in the *Railroad Gazette* of June 6. All of this information would no doubt be placed at the disposal of the committee or of any railroad officer who wished to investigate the subject for himself; and the immense mass of material now possessed by the makers of the Janney coupler is probably also at the service of those railroad officers who wish to investigate coupler failures in good faith. So that of couplers that have actually got into service, it is today possible to know from recorded facts pretty nearly all that the proposed tests would give; and those recorded facts cover now more couplers and a greater variety of conditions than could be covered by placing experimental lots on one or two roads. They cover thousands, and in one case hundreds of thousands, of individual couplers and dozens of roads and many months of service. We doubt, therefore, if it would be possible to induce the M. C. B. Association to take up any such scheme of experiments as Mr. Robert suggests, even if it could be persuaded to enlarge the field for invention, as he wishes.

The proposition to allow the coupler contour to depart from the M. C. B. lines is not new. It has been repeatedly urged, and the fact that makers will not adhere to those lines is one of the strongest reasons for the appointment of the committee. It is claimed that the lines restrict inventors to the locking device alone. On the contrary, there are now a dozen or more couplers, some of them very good ones, differing in various patented features, and no doubt others will crop up. The lines are free to all, and within these limits there is a sufficient range in the positions of the pivot and of the lock and in the forms of knuckle and head to encourage inventors and insure progress and prevent monopoly. On the other hand, to abandon the contour arrived at by the M. C. B. committee after long and careful study and experiment and adopted by the Association, would be to give up a great deal of the ground gained. Two years and a half ago uniformity was at last made possible. This condition had been reached after years of investigation and by much conscientious work and against

obstinate opposition. Within a year great progress has been made in adopting the uniform coupler which the labors of the M. C. B. Association made possible. One of the greatest obstacles that now stands in its way is the refusal of the makers to recognize that there is a standard contour, or their carelessness in not conforming strictly to that contour.

On the whole, it would be a step backward to give up the standard lines. The Association should say to the inventors: "Our standard has been fixed; we shall not depart from it. If you can make something bet-

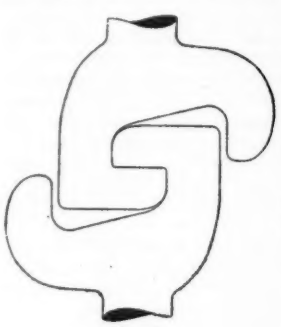

Fig. 1.

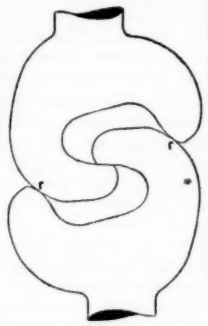

Fig. 2.

ter than our standard, do so, but the burden of the demonstration is on you. We have spent our time and labor and money, and we are satisfied that the coupler will be developed on our lines. Now, if you can prove that those lines are defective and that you can make a better coupler, go ahead and prove it, and then we will help you; but until you do prove it the fight is entirely yours." The fact is that no one has proved or even come near proving that he has devised, or can devise, a better contour than the M. C. B. lines. It would be presumptuous to say that a better contour will not be discovered. No one supposes that the M. C. B. committee was a fountain of wisdom. It was simply a human committee, but it did an honest and workmanlike job.

Although, as we have said, some one may get a better contour than the M. C. B. standard, the presumption is against him when he departs from it. Some weeks ago (July 25 and Aug. 8) we discussed at length the question of coupler lines, with particular reference to the permissible original variation and the safe limit of wear. We showed that a departure from the M. C. B. lines in the direction of fig. 1 would add to the difficulty of coupling, but it would increase the permissible limit of wear. The changes from the Janney lines made by the Master Car Builders' committee were slightly in this direction; that is, they increased the fullness at the heel of the knuckle and of the guard arm. A further change in this direction would not be advisable, because, if for no other reason, it would still further limit the number of possible contours that would couple with the standard. Fig. 2 shows a variation in the other direction, which is the outline of a coupler that has been made and used. This diagram shows the objection to a modification of the M. C. B. lines toward the form that will make coupling easier among a variety of contours, and will give greater freedom to designers in locating the pivot. If any changes are made they should be toward greater safety and durability, and the two diagrams show that changes that give more freedom in design will decrease the very elements that are most important.

On the whole, the case seems to be against those who want to depart from the standard lines, and the true policy of the M. C. B. Association is to stick to its standard until some one can prove that he has lines that are decidedly better.

Conditions Affecting Passenger Traffic.

The Hungarian experiments in cheap travel continue to attract a great deal of attention, and not a few writers on this side of the Atlantic urge our railroad managers to go and do likewise. As we have before pointed out, the service rendered by most of the Hungarian trains is of such a character that it is not really quite so cheap as it looks. But even if it were, the experience of a country with dense population is no guide for one which is more thinly settled.

As an example of the wrong ideas current on the subject, we quote from a newspaper report of an address by Prof. James:

"England, in proportion to her population, has five times as many railway passengers as this country has, and this is because the poor, the workers and the economical can travel cheaper than they can here, if they are content to do so without those comforts of travel which we have and are compelled to pay so dearly for. In America the increase in mileage and traffic is almost equal. In England traffic has increased much faster than mileage. Of the 775,000,000 passengers in the English returns, at least 88 per cent. were third class, for which grade we have no accommodations. Millions of Americans would be content to travel in less luxurious cars if they could do so at cheap rates."

There are two faults in this. In the first place it is not true; in the second place, if it were true it would not prove anything. We are developing our railroad system into new regions, where it is wholly impossible to secure a large passenger traffic such as is readily obtained in suburban districts. The development of passenger business in the East is offset by the construction of new mileage at the West. Situated as we are, it is on the whole surprising that we do so well as is actually the case. We have, in proportion to our population, about one-third the number of passenger journeys which there are in England, and, taking the greater length of journeys into account, we probably have just about the same *per capita* passenger movement. That is to say, with a little over twice the population of England and Wales, we probably have a little over twice the passenger mileage.

But the conditions are so different that such a comparison amounts to very little. Let us compare England with Massachusetts. Here the conditions are more alike. Each has substantially completed its railroad system; each has a fairly dense population and a considerable suburban passenger movement. The results are somewhat striking. We give the figures for 1888; those for 1889 would show no essential change:

	England and Wales.	Massachusetts.
Population	29,000,000	2,100,000
Passengers	654,000,000	90,000,000
Average per head of population	22½	43

So far from coming out at the wrong end of the comparison, Massachusetts shows about twice the number of passenger journeys per head of population which we find in England. The passenger traffic of Interstate roads will slightly lessen the significance of this result, but not a great deal.

The average fare per passenger mile in Massachusetts was 1.9 cents. In England it was certainly not lower than this, and most authorities place it from 10 to 20 per cent. higher. The average Massachusetts rate is about the same as the third class rate in England. Barring roads in thinly settled districts, the difference between American and English passenger fares in general is not very great.

There is a prevalent idea that enormous numbers of people stand ready to travel if they can only get lower rates, and that they would be quite content to put up with poorer accommodations for this end. Such a theory hardly bears the test of facts. It is but recently that certain western roads have shown by their actions that second-class travel did not pay. The efforts to run cheap workingmen's trains, which have been so successful in Europe, have hitherto disappointed their promoters in this country. The average American sets a higher value on time, comfort and social standing than the average European and shows little inclination to put up with cheaper accommodations than his fellows.

We believe that there is room for a decided development of American passenger travel. But we do not believe that this is to be secured by sacrificing quality to cheapness. The conditions governing the business in a sparsely settled population of well-to-do citizens are wholly different from those which prevail among a population at once denser and poorer. Any conclusions drawn from the one can only be applied to the other with the utmost reserve.

Aluminum in Railroad Engineering.

Many faulty statements are made in the press regarding the uses to which aluminum may be put in engineering structures. There is the less excuse for the common misconception of the probable application of this useful metal, as its true value is well known and it is for sale in large quantities in the open market. Except in the matter of alloys, almost as much is known regarding its physical properties as of copper.

It has often been claimed that aluminum will eventually supersede steel in general construction, and many people expect some day to see huge bridges of white, shining metal, in place of the dull, painted steel. Now, while this is a beautiful picture, yet it is a possibility rather than a probability. Aluminum is of itself a comparatively weak metal, and when combined in large proportions with other metals it makes a weak alloy. Thus one finds the pure metal has a tensile strength compared with other metals with which we are more familiar as follows:

Aluminum	27,000	lbs. per sq. in.	weighing	168	lbs. per cu. ft.
Wrought iron	50,000	"	"	480	"	"
Structural steel	78,000	"	"	490	"	"

Hence in round numbers aluminum has in rolled shapes ⅓ of the weight and ¼ of the tensile strength of structural steel. It is easy to reason from this that tension members of bridges would necessarily be as heavy as those of steel because they would require three times the cross section to carry the load. The compression members of a bridge would be large indeed when made of aluminum, if the compression tests of that metal are to be relied upon. It is recorded as "12,000 lbs. ultimate strength per square inch under compression in cylinders, with length twice the diameter," on the books of the Pittsburgh Reduction Company. Structural steel has easily eight times this resistance to compression. A bridge then would have eight times the sectional area of posts and struts, and hence these members would weigh nearly three times as much as if of steel. However, it must be said that ultimate compression tests are not as conclusive as those to determine the ultimate tension of metals; therefore the 12,000 lbs. assumed may be somewhat different in fact, particularly so after the metal has had a hard rolling. So the beautiful shining white bridges would be pretty clumsy looking structures, after all, with their vast members. But supposing we could make a lighter railroad bridge of aluminum, it would seldom be desirable; for any ordinary span weight is an element to be provided rather than avoided.

Strength and weight alone are not all of the attributes desirable in a structural material. It must have a combined tensile and compressive strength and elasticity that will enable it to hold well where bolted and riveted. Already steel, with its high carrying qualities, is found to be so prone to expand around rivet and bolt holes that great pains must be taken with joints subjected to severe alternating strains. In car trucks rivets have to be driven with great care in order to prevent looseness after continued service, and when bolts are used they have to be tightened continually. With aluminum this trouble would be increased, and no end of difficulty would result if such a metal, with great ductility and low resistance to compression, were used, and as satisfactory joints as can be now made between pieces of high grade steel would be impossible.

We are speaking now of the commercially pure metal, not of its alloys; they are not aluminum. Aluminum bronze is 90 per cent. of copper, and aluminum steel and iron have but one per cent. or less of the pure metal. The advantage of aluminum admixture in iron, whether wrought or cast, or steel is about the same. It removes some of the carbon—just how or in what manner is disputed—but the result is the same. The carbon is reduced, and the metal is softer and flows more readily when melted. Those who seek further information on this subject should read a most admirable paper on "Aluminum in Wrought Iron and Steel Castings," read by W. J. Keep, of Detroit, Mich., before the American Institute of Mining Engineers at Washington last February. It is aluminum which renders the casting of wrought iron possible by the mitis process, and that metal also which gives us good, sound castings of steel and solid castings of cast iron which will take a high polish. One authority says: "It will be noticed that aluminum expels carbon; but this is not due to the expulsion of graphite already in the molten metal, and not to the change of combined into graphitic carbon. The combined carbon is even increased." Another writes: "The influence of aluminum in steel of high carbon is to turn the combined carbon into graphite." There is a conflict of opinion as to the real action which takes place, but the effect is the same; and we have aluminum as a most valuable aid in making good strong shapes of iron in its three common forms, of wrought iron, steel and cast iron. But these shapes can hardly be called alloys, and they do not indicate the value of aluminum as a structural material.

We return to a consideration of aluminum individually, or when used in preponderance in an alloy. Take, for instance, the roofs of railroad cars. Its durability and lightness recommend it at once, but its low tensile strength would demand that it have considerable thickness and be corrugated, otherwise a brakeman's foot would bend it. The joints must be riveted, as soldering is impracticable with that metal; this would, perhaps, be no objection, as by overlapping the corrugations they could be made water-tight. Probably the sides of cars receive too rough treatment to allow the use of aluminum except in considerable thickness. One may think of it in its resisting properties as being quite like copper and not go far wrong.

At present prices the cost per pound is about six times that of copper. Per cubic inch it now costs less than twice as much. A sheet of equal thickness and having approximately the same mechanical properties as copper costs about twice as much and weighs less

than one-third of the copper sheet. Wherever copper can be used to advantage in railroad work, aluminum can be used also with the greater advantage of being lighter and less liable to oxidation, but harder to work, as it cannot be as easily soldered as copper. In most cases for large coverings it must be riveted or fastened with a clinch joint; yet it is possible that manufacturers of rolled sheet would, for a small increase in selling price, cover the edges with a coating of metal which will take solder.

The effect of using in structures a metal for rolled shapes which has a resistance to compression much less than its resistance to tension is interesting. Nearly all materials that we now use for such purposes have greater resistance to compression, and a majority of all formulas for carrying capacity are based on an exact equality. If a new material, having a resistance to compression, such as aluminum, with only one-third to one-half of its resistance to tension, were introduced, then new formulas would be needed. It is customary to assume the neutral axis of a rolled beam of symmetrical section to be in the centre of the section. If the material were aluminum, the true axis, according to the recent tests of that metal, would be nearer the bottom than the top of the beam.

There are but few places in engineering work where lightness alone would govern the adoption of the material of construction. At equal cost two materials, one light and the other heavy, would have to fight for supremacy on the ground of durability and safety; safety in this sense implying reliability and absolute strength. Continued vibration and repeated strain cause more failures than weakness or lack of material. The properties of wrought iron and cast iron are well known and they are used with confidence in trying locations; but with all existing knowledge of these materials designers are inclining towards rolled and cast steel for all parts bearing repeated strains and shocks. One can but notice that this step is away from rather than towards a material having characteristics like those of aluminum. It is a step away from all metals like copper, silver, tin, lead, etc., and if these were only one-half the price of steel they would never be used for structural work.

But the alloys of aluminum are promising, and it seems highly probable, from what we know, that if copper were as cheap as steel, even with aluminum and manganese at the present prices, we all should look to manganese and aluminum bronzes for difficult work. However, steel would still have the advantage in being more easily worked and in being more uniform.

We do not wish to say that aluminum has no field of its own in engineering, for it has a most important one. In railroad work, for details of signal appliances, station fittings and coverings, it would be difficult to imagine a more fitting material. For rolling stock it would be of the greatest advantage in car trimmings, seats and ceilings, as well as outer coverings, particularly in Europe, where steel sheets are largely used for this purpose. So on locomotives, the casings, cabs and fittings, as well as jackets, could be made of commercially pure aluminum, while the high grade bronzes might be used for pistons, rods and vibrating parts when we know more of their reliability under the vibratory stresses to which these parts are subjected. Unfortunately for aluminum, it is in general no advantage to reduce the weight of a locomotive, or that metal might be used in the place of the heavy iron castings thereon.

Probably no metal could be selected which will so satisfactorily as aluminum replace other materials now used in those articles with which the general public comes in contact. Its future is assured and its advantages will be better appreciated by the people than those of steel ever have been, for it will come nearer to them in daily life. But in railroad work and engineering structures it must rank with copper as a material and serve to teach us the great value of iron, particularly when combined with carbon in the form of steel.

The Chicago, Milwaukee & St. Paul commenced operating the sleeping car service over its road on Tuesday of this week, its eight-year contract with the Pullman company having expired the day before. The ownership of the cars was largely held by the road, the Pullman Company being virtually only a lessee. As this road formerly operated its own sleeping cars the officers ought to be good judges of both plans of working, and it is therefore to be assumed that they have made a wise decision. The reports state that there are about 150 sleeping cars on the St. Paul system. It is rumored that there is behind this an intention to turn the business over to the Wagner company, but nothing definite in this line is published. As the St. Paul has few or no lines on which it is necessary or even desirable to run cars through over the lines of other roads it is well situated to keep the sleeping car business in its own hands. The press dispatch printed a fortnight ago to the effect that this road would reduce the wages of its parlor car conductors (colored men) $20 per month appears to be explained by the change of proprietorship now announced, and evidently refers to porters instead of conductors. The Chicago, Milwaukee & St. Paul apparently has no intention of breaking away from the time-honored custom of requiring sleeping car porters to collect a considerable portion of their salaries direct from the passengers. It will be remembered that the statistician of the Interstate Commerce Commission referred in his annual report to the large amount of railroad capital which escapes tabulation because not controlled by railroad companies. Here is a similar item which has apparently been overlooked and deserves his attention. Earnings as well as capital should be correctly published. In this case there is no outside corporation to complicate matters, and who knows but that by adding these sums, which are paid in an "unofficial" manner, the gross earnings of the railroads of the country can be made enough larger to materially increase the pride of American statisticians when they compare traffic figures with those of European roads.

In connection with the killing of two civil engineers while they were walking on a bridge of the New York, New Haven & Hartford, at East Lyme, Conn., a fortnight since, a correspondent of the New York *Tribune* inquires why the train was not running slowly at that point, in accordance with the Connecticut law requiring a stop for drawbridges, which was passed in 1853, after the Norwalk disaster. There is a draw in the bridge referred to, and it appears that it is not provided with interlocked distant signals, which signals when in use afford ground on which the railroad commissioners may properly authorize a road to run its trains over a drawbridge without stopping. The fact comes out, however, that the Railroad Commissioners of Connecticut in 1854, the next year after the passage of the law, authorized the crossing of 12 short drawbridges, of which this was one, without stopping. Whether they imposed any regulations or restrictions on the railroad company does not appear. Probably railroad companies which run fast express trains over poorly guarded draws would argue that the bridges are very infrequently opened; and in the Connecticut case there is apparently a record of 36 years' immunity from accident with 12 bridges, equal to 432 years with one bridge; and who could ask for better service than that? Nevertheless, a drawbridge that is worth having ought to be worth tending—or, at least, there should be a watchman somewhere near by—and if there is an attendant the cost of the best signals is so insignificant that there is no excuse for leaving the man with nothing but a flag and lantern.

One of our contemporaries, which purports to be an expert both in "engineering news" and in technical matters such as come within the province of a "railway journal," heralds to the world the "news" that the bicycle locomotive, with its concomitant blessings, is to be adopted on a 100-mile road west of the Mississippi, and that the 1,000 passenger cars of the Manhattan (New York elevated) are to be lighted by electricity, a dynamo to be carried on each locomotive. These items have, indeed, been printed in reputable daily papers (or papers which are reputable in everything except news and politics); but in view of the constant practice which every technical journal must have in throwing out alleged news, these two items are flagrant instances of a sensational habit which misleads careless or ignorant readers and wastes the time of others. The electric lighting item, however, seems to have originated, we regret to say, in a technical paper, which apparently was hard up for an editorial topic that week.

NEW PUBLICATIONS.

Strains in Framed Structures.—Rather singularly, the copy of Du Bois' work on the "Strains in Framed Structures" which we reviewed last week lacked the last five pages of the last chapter on erection, together with several plates relating to that subject. This was not noticed until our review was in print and was probably owing to the gatherer, who put this copy of the book together, omitting to put in these pages. This chapter on erection consists of 16 pages instead of 11, and contains 17 plates instead of 11. The remarks in the last paragraph of our review, therefore, in which it was stated that this chapter was somewhat incomplete, must be modified, as the last five pages give a very good account of the erection of cantilevers, viaducts, elevated railroads, and other structures.

Slide Valve Gears. By F. A. Halsey. D. Van Nostrand Company, New York.

The slide valve has been for years such a favorite text with writers on mechanical subjects, and we have been invited to read so many articles, chapters and even books which contain nothing new of value, that the title "Slide Valve Gears" is far from being attractive. However, the author of the present work has succeeded where many have failed and has produced a really valuable, practical book, even though it contains but little which is entirely new.

The most noteworthy features of the book are the very clear explanations of the Bilgram valve diagram as applied to the plain slide valve, to shifting eccentrics and to the Gonzenbach and Meyer cut-off valve gears, and of the author's method of equalizing lead and cut-off by means of inclined rocker arms. The substance of this portion of the book has appeared in the columns of the *American Machinist*, but is not otherwise accessible.

The rest of the 130 pages which comprise the text are principally devoted to a detailed description of the action of the plain slide valve, and to descriptions of the valves used on several of the automatic shaft governor engines, and the Bilgram valve gear. Link motions and radial valve gears are not discussed at all.

Designers of valve gears will agree with the author's statement that "designing a valve gear is essentially a drawing-board process, and a mathematical treatment of it is simply an uncalled-for use of heavy artillery," and will doubtless approve of the use of purely graphical methods throughout the work. The Bilgram diagram has undoubtedly marked advantages as compared with the Zeuner diagram and is not at all difficult to understand. Those who are familiar with the Zeuner diagram will find that they have little to unlearn and that very little study is necessary in order to master the Bilgram diagram.

Altogether, Mr. Halsey has contributed a valuable addition to the literature on valve gears which, while specially valuable to students, is well worthy of the attention of all who are interested in the subject.

TRADE CATALOGUES.

The Weston Electrical Instrument Co., of Newark, N. J., has issued a descriptive circular, catalogue, and price list of the Weston standard portable direct reading volt meters, air meters, and other electrical measuring instruments. This catalogue is well illustrated, and gives considerable information regarding this class of instruments.

TECHNICAL.

Manufacturing and Business.

In spite of the talk about retaliation on account of the McKinley tariff, the Ingersoll-Sergeant Rock Drill Co. continues to receive orders for mining machinery for foreign countries. It has just received a second order for a plant of submarine drilling machinery for removing the Iron Gates of the Danube River, Austro-Hungary.

Richard Vose announces that the Richard Vose Car Spring Co. will hereafter conduct the business of manufacturing his graduated springs for railroad cars, which has for so many years been conducted in his own name. The representatives connected with the company are John C. N. Guibert (Secretary), and Gustavus Suckow, 115 Broadway, New York; A. W. Slee, 500 American Central Building, St. Louis, Mo., and William P. Williams, 717 Phœnix Building, Chicago.

The Standard Car Coupling Co., of New York, received orders in October for 1,000 couplers for the Delaware & Hudson Canal Co., and 250 for the Buffalo, Rochester & Pittsburgh. Its monthly orders from the Delaware, Lackawanna & Western have already aggregated over 300 cars, and the New York Central has given large orders each month for all its 34-ft. cars receiving general repairs. An office has been opened in the Rookery Building, Chicago, by William Jones, Vice-President.

The G. A. Gray Company, manufacturers of heavy planers and other machinery for railroad shops, has arranged for the removal of its works from Cincinnati to Chicago. Their capacity will at the same time be greatly increased.

The Lunkenheimer Brass Mfg. Co., of Cincinnati, is about to remove its factory from its present location to Fairmont, a suburb of Cincinnati. The firm has secured two acres of ground, and will build this winter so as to make the transfer in the spring.

Dilworth, Porter & Co., of Pittsburgh, will commence this month the manufacture of both the common and Goldie railroad spikes from soft Bessemer steel instead of iron. The firm will hereafter manufacture spikes either from muck iron or Bessemer steel.

The Eames Vacuum Brake Co. has an order to equip 57 engines with driver brakes, and the New York Brake Co. has an order for the brake fittings of about 1,000 cars.

The Kellogg Tube Works of Findlay, O., will soon commence the use of a new system for rolling seamless tubes from hollow cast ingots, invented by William Heckert, the General Superintendent of the works. The company has built a complete new machine under the Heckert patents, attaching it to one side of the driving machine and engine.

The Prescott Equipment Co., of Chicago, has been chartered to manufacture all kinds of railroad supplies. Joseph W. Taylor, Charles Eldred, and Marshall Lapham are the incorporators.

The Chapman Valve Co. is building an addition to its works at Indian Orchard, Mass. The building will be of brick, 120x50 ft., three stories high, and will increase the output of the company about 30 per cent.

A company for the manufacture of car wheels and other railroad appliances has been organized at Detroit, Mich., under the title of the Rigby Safety Car Wheel Co. The capital stock is $500,000, of which $325,000 is paid in.

The Detroit Lubricator Co., of Detroit, has an order for 628 Detroit lubricators to be delivered at once for a British colonial railroad system.

We are informed that the Dixon silica-graphite paint is being used on the great iron viaduct of the Pennsylvania Railroad in Jersey City. It is said to be very easily worked and to have a covering power twice as great as that of white lead and three times that of other mineral paints. This paint is made by the Joseph Dixon Crucible Co., Jersey City, N. J.

Iron and Steel.

The Troy Steel & Iron Co., of Troy, N. Y., has lately adopted the direct Bessemer process, successfully carrying the molten iron in ladles on a steamer from the furnaces on the island to the steel plant. Two of the blast

furnaces are now being relined, the principal change being an increase in the size of the bosh.

The North Branch Steel Works, at Danville, Pa., which has been idle for some time on account of a strike among the workmen, has resumed operations. The mill was formerly known as the Co-operative Iron & Steel Works, was established in 1871 and was operated for years as a rail mill. It was changed to a steel mill in 1882-3 and an open-hearth steel plant established, and it has now an annual capacity of 122,000 net tons.

The Youngstown Iron & Steel Co., of Youngstown, Ohio, is erecting seven additional puddling furnaces at the plant of the Warren Iron & Steel Co., at Warren, Ohio, which was recently purchased. Plans for the machine shop, roll turner shop and blacksmith shop of the Youngstown Rolling Mill Co., recently destroyed by fire, have been made. The new buildings will be of iron.

The report that the Allegheny Bessemer Steel Co. had sold its extensive rail mills at Duquesne, Pa., to the Carnegies is denied by Carnegie Bros. & Co.

The great National Rolling Mill, of McKeesport, Pa., is now changing its furnaces for the use of coal, and in a few weeks the entire plant will use coal. A number of other large plants have or are doing the same.

The West Superior Iron & Steel Co., has placed an order with the Pittsburgh Iron & Steel Engineering Co. for a 20-in. structural mill with 36×48 engines, shears and a full complement of machinery to make structural shapes up to 14 in. The buildings will be of iron and will cover about two acres of ground. The iron and steel required for the McDoughal Ship Yards, at West Superior, will be furnished by this company, and it is expected that at least 40,000 tons will be required next year.

The Rail Market.

Steel Rails.—Very few orders have been placed, but there are numerous inquiries in the market. Some New England business has been done by the Eastern mills. The quotations are nominally $29.

Old Rails.—Sales of over 2,000 tons of old iron rails have been made to go west, and about 2,000 tons of old iron rails, and the same amount of steel rails, have been sold in advance of arrival at New York.

The dealers give $25 as the quotation at New York for iron and $21 for steel rails, but these prices are above the figure at which sales are made. Pittsburgh quotes $28@$28.50 for old iron rails and $18.50@$19 for steel. At Chicago sales of iron rails have been made at $25.50 and old steel rails at $16.50@$20.50, according to length.

The Horton Shops of the Rock Island.

The town of Horton, Kansas, has had a phenomenal growth within the last four years. The C., K. & N. division of the Chicago, Rock Island & Pacific established shops at that point four years ago for repairing passenger cars, freight cars, and locomotives, and now employs about 300 hands. The town has a population of 4,000. These shops are peculiar in arrangement, the passenger and freight car shop being formed on a plan like the letter T, and the top of the T being devoted to machinery, and in the stem of the T are located parallel tracks, which hold the cars. There is a roundhouse with 38 stalls, with a turn-table in the centre, and a machine shop well equipped with good tools. There are two transfer tables, the one in front of the locomotive shop being driven by steam. A drop table is used to remove locomotive drivers. The tools in these shops are all new, not one of them being over four years old. All repairs on the C., R. I. & P. west of the Missouri River are made at this point, and the shops are in charge of Mr. Monkhouse, Assistant General Master Mechanic and Assistant Master Car Builder.

New Shops.

The citizens of Chillicothe, O., having almost unanimously voted to issue $100,000 of municipal bonds for the purpose, the shops of the Baltimore & Ohio Southwestern will be located there.

An election will soon be held in Bellefonte, O., to vote on a proposition to issue town bonds to the Cleveland, Cincinnati, Chicago & St. Louis if that company will build division shops at Bellefonte. The citizens claim that the town is an eligible location as it is the junction of the old "Bee Line" and the recently acquired Cincinnati, Sandusky & Cleveland division, and is thus geographically suitably located. It does not appear that the company has agreed to build the shops.

A Screw Ferry Boat for the Erie.

Messrs. Neafie & Levy, of Philadelpnia, Pa., are now building for the Erie a steel, double screw, single deck, ferry boat. Her name will be the "John G. McCullough," and she will be in service on the Pavonia Ferry about Jan. 1 next. The principal dimensions are:

	Ft.
Length over guards	215
Length of beam over guards	62
Depth	14½

The following is a condensed description from the specifications:

Hull.—Open hearth steel plates; bottom, $\frac{7}{16}$ of an inch thick; bilge, $\frac{7}{16}$ of an inch thick; sides, $\frac{5}{16}$ of an inch thick; on water line, double plates, 1 in. thick.

Engines.—Inverted, compound, surface condensing, propeller of Reveiver type; cylinders 26 in. diameter high pressure, 50 in. diameter low pressure; 30 in. stroke. Valve and reversing gear of Stevenson's reversing link type, operated by steam; links, double bar type. Independent pump, double acting. Circulating pump to be centrifugal, capacity 1,400 gallons per minute. Independent feed pump. Propelier shaft wrought iron, 9 in. diameter; propeller wheels of bronze metal, 8 ft. 4 in. diameter, one at each end of shaft; one working forward and one backward at the same time, both fast on one shaft. Engines, 1,200 H. P.

Boilers.—Two, steel, Scotch type, 12 ft. 3 in. diameter by 11 ft. 3 in. long, containing three furnaces 43 in. in diameter; to carry 100 lbs. steam pressure.

Steering Gear.—Williamson Bros.' steam steering gear.

Cabins.—Joiner work in cabins will be finished in first-class style. The cabins will be about 150 ft. long each, clear way, as there will be no wheel-house in the centre, and the cabins will be handsomely decorated. The boat will be lighted by electricity throughout.

The general appearance of this boat will be similar to that of the "Bergen," owned by the Hoboken Ferry Co.

An Allis Triple Expansion Engine.

The Narragansett Electric Light Co. has recently put in operation at its works a new triple expansion engine built by the E. P. Allis Engine Co., of Milwaukee, Wis. The engine is a Reynolds-Corliss with cylinders 14.25 and 33 in. in diameter and 48 in. stroke. The high-pressure and intermediate cylinders are placed tandem and connect with one crank, while the low-pressure cylinder connects with a second crank set at right angles to the first. The piston of the high-pressure cylinder has a single rod connecting directly with the low-pressure piston, which in turn has two rods (operating), the crosshead and connecting rod. The three cylinders are jacketed, the valves being located in the several covers. The high-pressure valve gear is controlled by a governor; the intermediate valve gear may be controlled by the same governor or by hand; the low-pressure gear is operated by a pair of eccentrics, one for the steam and one for the exhaust valves, the cut-off being controlled by hand. An independent condensing apparatus is used, composed of a surface condenser, an air pump 24 in. in diameter, a circulating pump of 16 in. diameter, both the latter being operated by a steam cylinder 12 in. in diameter, the stroke of all being 16 in. The engine was guaranteed not to use more than 12.6 lbs. by weight of steam per horse power per hour under operating load, and has been accepted by the Narragansett Co. as fully satisfactory.

Forged Steel Car Wheels.

The Forged Steel Car Wheel Co., of New Jersey, is developing a process for forging steel car wheels from the ingot, under the patents of Mr. J. A. Facer, of Germantown, Phila. Experiments have been recently made at the works of the Buffalo Steam Forge Co., where four wheels have been made. The process is carried out by two hammers with the requisite dies. The ingot of open-hearth steel is placed under the first hammer, which contains dies by which it is first hammered on the circumference, and then reduced approximately to the thickness of the finished wheel. Then by means of other dies the tread and flanges are hammered into shape. At the end of this stage the wheel is of uniform thickness throughout and the formation of the hub has not begun. The wheel is then put under the second hammer, under which the hub is formed and the metal between the hub and the tire reamed out to the necessary thickness of plate. It is expected to make the wheel as light as a chilled cast iron wheel of the same diameter and to sell it for much less than any steel wheel has yet been offered at.

Negotiations are in progress looking to the establishment of works which it is expected will soon be erected. The wheel will be handled by Messrs. Porch, Gibb & Rogers, general agents of the Forged Steel Car Wheel Co., 289 Bullitt Building, Philadelphia.

The Grant Locomotive Works.

The legal entanglements which have prevented the consummation of the plan to locate the Grant Locomotive Works at Chicago have been removed by the settlement last week of the case in the Supreme Court of Illinois. Certain parties endeavored to enjoin the sale of the land for the plant to the company at $602,000, on technical grounds. The sale is now confirmed and work will begin at once on the buildings. It is the intention to expend about $1,000,000 for a plant capable of turning out 250 engines annually. The buildings will be modeled somewhat after the new shops of the Pennsylvania at Altoona, and so arranged that additions when necessary can be made without remodeling the original buildings. The works will be located just outside the western city limits directly westward from the business centre. The company has acquired a section of land so that there will be ample room for all purposes. Mr. E. T. Jeffery, recently General Manager of the Illinois Central, and Mr. George M. Bogue, well known in railroad circles, are the leading spirits of the Chicago directors of the Grant Company.

LOCOMOTIVE BUILDING.

The Manchester Locomotive Works, of Manchester, N. H., have about completed a 10-wheel freight engine recently ordered by the New York, Providence & Boston road. The dimensions are: Cylinders, 19 × 26 in; diameter of drivers, 63 in.; 78-in. fire box; boiler shell, 56 in. diameter, with 236 flues. The engine will weigh when completed 114,000 lbs.

The Mexican (Vera Cruz) road has ordered four new compound engines for service between the City of Mexico and Esperanza, from Dübs & Co., Glasgow. Three new Fairlie engines have been ordered for the mountain section.

The Missouri, Kansas & Texas will let a contract in New York this week for 15 engines.

The Chicago, Burlington & Quincy has let a large order for engines to the Rogers Locomotive Works. The number, however, has not yet been decided upon. The locomotives are to be of the standard class "H" pattern, mogul engines, for either passenger or freight service.

The Chicago & Northwestern has let 25 ten-wheel passenger engines, 30 ten-wheel freight, and 10 six-wheel switching engines to the Schenectady Locomotive Works.

The Louisville & Nashville has let 25 locomotives to the New York Locomotive Works, Rome, N. Y., which will be equipped with the New York Air Brake Co.'s driver brake.

Nine of the ten locomotives recently ordered by the Cincinnati, Hamilton & Dayton have been delivered; of these six were built at the Schenectady Works. These are four-wheel connected engines, with cylinders 18 × 24. Two six-wheeled switching engines, 17 × 24, were built at the New York Locomotive Works, at Rome, N. Y. The other two are Baldwin consolidations, eight drivers, cylinders 20 × 24.

CAR BUILDING.

The Lehigh Valley is in the market for 2,000 standard house cars of 60,000 lbs. capacity, for which bids will be received up to Dec. 1. These cars are to be similar to the 2,500 house cars which were built for the road last winter.

The Lake Erie & Western is reported in the market for a large amount of new equipment.

The 5,000 Philadelphia & Reading cars were awarded to the Pullman Co. on Thursday or Friday of last week.

The Cincinnati, Hamilton & Dayton is having 50 buggy cars built at the Lima shops of the Lafayette Car Co.

The Standard Oil Co. (Union Tank Line) is building 350 tank cars at its shops in Buffalo and Cleveland. The Harrisburg Car Co. has an order from the company for 150 cars which will probably be completed in January.

The Missouri, Kansas & Texas is asking bids for 2,000 cars to be equipped with air brakes and automatic couplers.

The 500 cars which the Jacksonville Southeastern is having built by the Mt. Vernon Car Co. will be equipped with the Boyden brake.

The Queen & Crescent system has received from the Ohio Falls Car Co., of Jeffersonville, Ind., four new passenger cars, one baggage and one postal car.

BRIDGE BUILDING.

Augusta, Ga.—The Charleston, Columbia & Augusta is to replace its wooden bridge across the Savannah River at Augusta with an iron bridge, which is being built by the Keystone Bridge Works. The piers of the old bridge will be used.

Birmingham, Ala.—Two of the Twenty-first street bridge piers are completed and the third and last, located on Powell avenue, is rapidly nearing completion. The south side abutment is also being built.

Cheyenne, Wyo.—It is expected that the Union Pacific viaduct matter will be settled in a few days. The viaduct will be at Central avenue and will cost $75,000, $50,000 to be paid by the city and the balance by the railroad company. The viaduct is to be of steel and iron and is to be commenced as soon as the contract is closed.

Louisa, Ky.—Alfred Copley, Bridge Commissioner of Lawrence County, will receive bids until Nov. 17 for building a wooden bridge across Rove Creek on Big Sandy Road.

McKeesport, Pa.—The Port Vue Bridge Co., which proposes to erect a bridge over the Youghiogheny at McKeesport, has organized by electing W. P. Wampler, of McKeesport, President; J. E. White, Vice-President, and Capt. D. H. Lynch, Secretary and Treasurer. The bridge will be commenced this winter.

Murphy, N. C.—The County Commissioners ask bids for constructing a bridge across Brasstown creek.

Philadelphia.—A sub-committee of City Councils' Survey Committee conferred last week with the chief engineers of the Pennsylvania and Philadelphia & Reading roads and the Chief of the Survey Bureau, on the subject of ordinances relating to the construction of several bridges. These ordinances provide for the following bridges: Over the Chestnut Hill branch of the Reading road at Graver's Lane or Union avenue. A bridge on the line of the Connecting Railroad, at Seventeenth street, said to be necessary to carry out the plan of grades lately received by the Bureau of Surveys. Chief Engineer Brown said that such a structure would cost about $61,000, and he did not think the company would erect the bridge. The company was ready to bridge Margaretta, Bridge and several other streets on the New York division to avoid grade crossings, and was only waiting for the city to act in the matter. For a bridge over the Reading road on the line of Seventeenth street, which, it is said, would cost $50,000. Several ordinances for bridges over Collom and other streets, in the twenty-second ward, were also discussed, but no action was taken.

The contract for the west approach to the Walnut street bridge at Twenty-second and Twenty-third streets will be let Nov. 17. The stone work on the bridge is being pushed rapidly forward, and the contractors, J. H. Hathaway & Co., expect to have it completed within a short time. The contractors are now at work on the west pier, the anchorage on either shore having been completed some time since. The coffer dam for the east pier is now being built, but the work has been retarded somewhat by the difficulty encountered in getting a foundation.

Sioux City, Ia.—The City Engineer has completed the plans for the viaduct that is to be built over the railroad tracks on lower Fourth street. The plans will be submitted to the council at meeting this week. The plans call for a viaduct 80 ft. wide, with an approach of the same width. The City Engineer estimates that the viaduct willl cost about $80,000. If it is made of iron and steel exclusively, as he recommends, instead of wood, it will cost more money.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Roxbury, $8 per share, payable Nov. 15.
Chicago & Alton, quarterly, $2 per share on the preferred and common stock, payable Dec. 1.
Cleveland & Pittsburgh, quarterly, 1¾ per cent., payable Dec. 1.
New York, Providence & Boston, quarterly, 2½ per cent., payable Nov. 10.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Danville, annual, Portsmouth, Va., Dec. 11.
Baltimore & Ohio, annual, Baltimore, Md., Nov. 17.
Boston & Maine, annual, Boston, Mass., Dec. 6.
Boston, Revere Beach & Lynn, annual, Boston, Mass., Nov. 20.
Boston, Winthrop & Shore, annual, Boston, Mass., Nov. 20.
Buffalo, Rochester & Pittsburgh, annual, 36 Wall street, New York City, Nov. 17.
Charlotte, Columbia & Augusta, annual, Columbia, S. C., Dec. 4.
Columbia & Greenville, annual, Columbia, S. C., Dec. 4.
Eastern (Mass.), annual, Boston, Mass., Dec. 10.
East Tennessee, Virginia & Georgia, annual, Knoxville, Tenn., Nov. 19, and special, Knoxville, Tenn., Dec. 6.
Fort Worth & Denver City, annual, Fort Worth, Tex., Dec. 9.
Georgia Pacific, annual, Birmingham, Ala., Nov. 26.
Keokuk & Western, annual, Keokuk, Ia., Dec. 4.
Marietta & North Georgia, special, Marietta, Ga., Nov. 25.
New York, Lake Erie & Western, annual, 21 Cortlandt street, New York City, Nov. 25.
New York, New Haven & Hartford, annual, New Haven, Conn., Dec. 17.
Pensacola & Atlantic, annual, Pensacola, Fla., Nov. 24.
Pittsburgh, Shenango & Lake Erie, special, Philadelphia, Pa., Nov. 19.
Richmond & Danville, annual, Richmond, Va., Dec. 3.
Richmond, Fredericksburg & Potomac, annual, Richmond, Va., Nov. 19.
Richmond & West Point Terminal, annual, Richmond, Va., Dec. 9.
Virginia Midland, annual, Alexandria, Va., Dec. 17.
Wabash, special, St. Louis, Mo., Nov. 25.
Wallkill Valley, annual, 5 Vanderbilt avenue, New York City, Dec. 10.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Southern & Southwestern Railway Club* will hold its next meeting at Nashville, Tenn., Nov. 20.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at eth rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on thefirst and third Wednesday in each month. at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m , on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetngs at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday, of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p.m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semimonthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court. Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds meetings on the first Wednesday in each month at Wichita. Kan.

American Institute of Electrical Engineers,

The fifty-first meeting will we held at eight o'clock on Tuesday evening, Nov. 18, at the rooms of the Institute, No. 12 West Thirty-first street, near Fifth avenue. A paper will be presented by Dr. Louis Bell on the "Theory of Compound Winding for Constant Potential;" also a note upon "A New Method of Analyzing Armature Reactions of Alternators," by Mr. Charles Steinmetz, in continuation of the discussion at the last meeting.

An International Engineering Congress.

The following is a report of the Convention held in Chicago, Oct. 14 and 15, 1890, to consider the establishment of an engineering headquarters, and the holding of an International Engineering Congress, during the World's Columbian Exposition, 1893.

The convention met in the rooms of the Western Society of Engineers, 78 La Salle street, Oct. 14. The societies represented and the delegates present were as follows:

The American Society of Civil Engineers—Wm. P. Shinn (President), C. L. Strobel, A. E. Hunt.

The American Society of Mechanical Engineers—Wm. Forsyth, Jesse M. Smith.

The American Institute of Mining Engineers—Wm. P. Shinn, A. E. Hunt.

Canadian Society of Civil Engineers—J. D. Barnett, O. Chanute.

The American Institute of Electrical Engineers—E. M. Izard.

The Engineers' Club of Philadelphia—H. W. Spangler, Wilfred T. Lewis, E. V. d'Invilliers.

The Civil Engineers' Club of St. Louis—J. B. Johnson, E. D. Meier, Robt. E. McMath.

Civil Engineers' Club of St. Paul—L. W. Rundlett, W. W. Curtis, S. D. Mason (president).

Wisconsin Electric Club—Warren S. Johnson.

Engineering Association of the Southwest—E. L. Corthell.

Civil Engineers' Club of Cleveland—Wm. T. Blunt, John Eisenmann.

Engineers' Club of Minneapolis—Wm. A. Pike, F. W. Cappelen.

The Society of Civil Engineers, Paris, France—E. L. Corthell.

The Engineers' Society of Western Pennsylvania—E. A. Hunt.

The Western Society of Engineers—O. Chanute, D. J. Whittemore, E. L. Corthell, C. L. Strobel.

Mr. E. L. Corthell explained the object of the meeting and letters were read from the Director General and Secretary of the "World's Columbian Exposition" heartily approving of the plan and promising assistance. The President of the Society of Civil Engineers of France also wrote wishing to be represented, and appointing Mr. E. L. Corthell, Corresponding Member, to represent the society.

The following report was submitted:

Engineering Headquarters.

In view of the existence in this country of several large engineering societies of high rank which will desire the use of headquarters for their own members, and for the entertainment of foreign visitors, and the inconvenience and expense which would result from the maintenance of separate establishments, we think it very desirable that all the engineering societies of recognized standing in the United States and Canada be requested to unite in establishing and maintaining a joint engineering headquarters during the continuance of the exposition. The exposition management will probably furnish space free of charge within the exposition buildings, but it may be deemed advisable to provide additional quarters outside; the headquarters to be a rendezvous for all the members of the engineering societies in this country, and their use to be freely tendered to all foreign engineers.

It is expected that the staff shall consist of a joint Secretary and two or more assistants, some of whom shall speak the principal European languages. The staff to be charged more especially with:

(*a*) To give information concerning the location of various engineering exhibits within the exposition.

(*b*) To give visiting and foreign engineers information about points of engineering interest outside of the exposition and to aid their investigations in other ways.

(*c*) To give visiting and foreign engineers introduction to those whom they may desire to meet, and to promote social intercourse.

(*d*) To keep a record of the addresses of visitors and to invite them to the International Engineering Congress hereinafter outlined.

It is estimated that the expense will amount to about $10,000. This it is suggested may be met by an assessment of one dollar per member on each engineering society of this country which shall join this proposed association, and also by voluntary contributions. The details to be hereafter adjusted. It is evident that this plan will be far more economical than that of maintaining separate headquarters by the several societies.

Engineering Congress.

At some time to be hereafter designated during the Columbian Exposition, it is proposed to hold within the Exposition, in a building which the management thereof proposes to furnish, an International Engineering Congress open to engineers of all nations. This congress to last six days and to be conducted in the English language. The opening session of welcome and organization to be a joint session, and if warranted by the attendance and the number of papers offered, the congress then to be divided into sections to consider and discuss the various branches of civil, mechanical, mining, metallurgical, electrical, military and naval engineering. A chairman and secretary for each section to be designated in advance, and the sessions to be so timed that papers and discussions on allied subjects shall not occur simultaneously so as to preclude those interested from attending several sections.

The congress to terminate with another joint session.

All papers, so far as practicable, to be furnished in advance, to be carefully examined by the proper committees under rules to be hereafter laid down, and if found acceptable to be printed for distribution in advance to the members of the Congress, at which they are to be chiefly read by title so as to admit of immediate discussion. Intending contributors to be requested to confine their papers, so far as possible, to such new and recent constructions, machines, processes, methods, experiments and investigations, including proposed standards of tests and measurement as are of engineering importance. Papers on purely speculative subjects should not be received.

A small fee (say $2) to be paid by members attending the congress to defray its expenses. The papers and discussions to be subsequently printed and furnished to such members as may so request at a stipulated price.

A permanent committee to be chosen in advance to organize the above proposed headquarters and congress.

E. L. CORTHELL,
O. CHANUTE,
JESSE M. SMITH,
D. J. WHITTEMORE,
C. L. STROBEL,
W. W. CURTIS,
J. B. JOHNSON,
} Committee.

The report was unanimously adopted.

In furtherance of the plan adopted the following resolution was passed by the convention:

Resolved, that it is the sense of this convention that the general permanent committee on International Congress and Engineering Headquarters be composed of one member from each of the societies which shall join in in the plan, except that the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineer, the American Institute of Electrical Engineers and the Canadian Society of Civil Engineers may each appoint two members, and the Western Society of Engineers may appoint three members of such committee.

JOHN W. WESTON, Secretary.

Canadian Institute.

The first meeting of the winter sesson of the Canadian Institute was held at Toronto, Nov. 7, President Carpmael in the chair. Several new members were elected. Mr. David Boyle read a paper entitled "The Canadian Institute of the Future." The writer referred to the approaching jubilee of the Institute as a fitting opportunity to look forward as well as backward. Reference was made to the work that has been performed, as evidenced by the many volumes of proceedings and transactions issued, and special notice was taken of the fact that Mr. Sanford Fleming first proposed the standard time system. It was felt, however, that the society had not secured the position which it should hold, and that some changes should be made to increase the interest of the members.

Engineering Association of the Southwest.

The annual meeting of the Association was held at the Y. M. C. A. building, Nashville, Tenn., on Thursday evening, Nov. 13, 1890, at 8 o'clock. The programme of the evening included the annual reports of the officers, an address by the President, Col. John MacLeod, of Louisville, Ky., and the election of officers for the ensuing year.

The nominating committee submitted the following nominees for offices for the ensuing year: For President, John V. Atkinson, A. V. Guide; for First Vice-President, William L. Dudley, William C. Smith; for Second Vice-President, J. H. Adams, Charles Hermany; for directors (from Tennessee), F. P. Clute, James Geddes, Hunter McDonald, W. F. Foster, E. C. Lewis and C. L. Thornburg; for directors (from other states), E. L. Corthell, John MacLeod, William Starling, L. M. Johnson, J. H. McCune and E. Thacher; for Secretary, O. H. Landreth, William T. Magruder (added by the secretary to supply omission); for Treasurer, W. B. Ross, E. Pardon.

In voting for directors members were entitled to cast three ballots, which could be given to the same candidate or distributed by writing before the name of the preferred candidate the number of votes you wish to cast for him.

The following amendment proposed at the meeting in Chattanooga, Tenn., Oct. 10, was voted on by letter ballot: *Resolved*, That Article I. of the Constitution of the Engineering Association of the Southwest be amended so as to read

"This Association shall be called the Engineering Association of the South."

The ballots will be canvassed at the first regular meeting following the annual meeting.

Engineers' Club of Cincinnati.

At the last meeting of the club there was an attendance of 17 members. Three applications for membership were received. The resignations of Messrs. Hinman and Schuermann were announced, both of whom have removed to distant cities. The Secretary announced the death of Charles L. Jungerman, and a committee was appointed to prepare suitable resolutions expressing the regrets of the club in the loss of its fellow member. Mr. J. C. Lemon read a very interesting paper on "Cast Iron Water Pipe." Mr. John W. Hill will read a paper on "Water-Works and Sewerage and their Influence on Public Health," at the next meeting to be held Nov. 20.

New York Railroad Club.

The next meeting of the club will be held at its rooms in the Gilsey House, New York City, on Nov. 20 at 2:30 p. m. The executive committee will submit for adoption a constitution and by-laws, and officers will be elected. All railroad men and manufacturers of and dealers in railroad supplies are invited to be present.

Southern & Southwestern Railway Club.

The club will hold its next regular meeting at the Maxwell House, Nashville, Tenn., on Nov. 20, at 10 a. m. The subjects to be discussed are as follows: "Types of locomotives best suited for heavy passenger and freight service—relative economy and safety of eight-wheeled, ten-wheeled and mogul engines," to be presented by Mr. James Meehan, Superintendent of Motive Power, Queen & Crescent system; and "Joint car inspection," to be presented by J. J. Casey, Superintendent of Motive Power, Louisville, New Orleans & Texas.

The Canadian Civil Engineers.

A meeting of the Canadian Society of Civil Engineers was held in Montreal last week, Mr. E. P. Hannaford presiding. An interesting paper was read by Prof. C. H. McLeod on "Errors of Levels and Leveling." Many of the members present took part in the discussion.

The Car Wheel Makers.

At the annual meeting of the Association of Manufacturers of Chilled Car Wheels, held in New York, Oct. 22, the following were elected as Officers and Executive Committee for the ensuing year: President, W. W. Snow; Vice-President, N. S. Bouton; Secretary and Treasurer, W. W. Lobdell. Executive Committee: John R. Whitney, F. J. Hecker, W. R. Davenport, G. B. Swett, S. P. Ensign. At a meeting of the Executive Committee John R. Whitney was elected Chairman and W. W. Lobdell Secretary. By the amendment to article third of the Constitution, the officers of the Association are ex-officio members of the Executive Committee.

The Western Railway Club.

This club will hold its next meeting on Tuesday, Nov. 18, 1890, at 2 o'clock p. m., in its rooms, 850-854 Rookery Building, corner Adams and La Salle streets, Chicago, Ill. Subjects: "Steel-tired Wheels and their Fastenings." The paper on this subject, read by Mr. Rhodes at the October meeting, will be discussed. "Swing Beam and Rigid Trucks;" some further data on this subject is expected from Mr. D. J. Darrall, of the Illinois Central Railway. "Draft Rigging;" a paper on this subject will be presented by Mr. C. A. Schroyer, of the C. & N. W. Ry.

PERSONAL.

—Mr. W. F. Dixon, the well known mechanical engineer, who has for some years been connected with the Cooke Locomotive Works, has become chief draughtsman for the Rogers Locomotive Works.

—Mrs. Mary Carroll, who acts as watchwoman at the entrance to the shops of the Central Railroad of Georgia at Macon, has recently been appointed to that position after 36 years' service as switch tender for the same road at the Southwestern Junction in Macon. Mrs. Carroll begun her active railroad life as an assistant or substitute for her husband, who held the position of switch tender at the junction.

—Mr. John Mulligan, the Superintendent of the Connecticut River road, has been elected President to succeed the late N. A. Leonard. During the 48 years that he has spent in railroad service Mr. Mulligan has become one of the best known and popular railroad officers in New England and he is well known outside that territory. He has served on but two roads. He was on the Western (Boston & Albany) between 1842 and 1852 as machinist and locomotive engineer, and on the Connecticut River road since 1850 as Master Mechanic for 16 years and as Superintendent for the last 22 years.

—Mr. Frank E. Merrill, General Superintendent of the St. Louis & San Francisco, has resigned to accept a position as Superintendent of the Chicago & Erie. Mr. Merrill has been General Superintendent of the line since last May, when he succeeded Mr. D. H. Nichols. He is 41 years old, and began railroad service as a telegraph operator in 1865. He was Assistant Superintendent of Construction and Division Superintendent of the West Shore between 1882 and 1884. He became connected with the St. Louis & San Francisco in the fall of 1886 as Superintendent of Construction.

—Mr. Charles H. Jackson, who has been Vice-President of the Union Switch & Signal Co., of Swissvale, Pa., for many years, has resigned that position on account of the pressure of his other duties. He will devote most of his time to the affairs of the United Electric Light & Power Co., of New York City, of which he is

General Manager. Mr. E. H. Goodman, who has been General Manager of the company since the death of Mr. Henry Snyder, last February, has been elected Vice-President by the board of directors, to succeed Mr. Jackson. Mr. Goodman was formerly Assistant General Manager.

—Mr. N. A. Leonard, President of the Connecticut River Railroad, died at his home in Springfield, Mass., Nov. 7, at the age of 65. Mr. Leonard had been President of the road ten years, and previous to that time was general counsel. He was one of the most distinguished lawyers in western Massachusetts. Mr. Leonard was a man of high conscientiousness and as a lawyer always looked on both sides of his cases, regarding the equity no less than the legal aspect. In fact, he was far from fulfilling the common idea of a lawyer, as he had not the power of making "the worse appear the better reason."

ELECTIONS AND APPOINTMENTS.

Alabama Midland.—H. C. Prince, formerly Traveling Auditor of the Louisville & Nashville, has been appointed Auditor of the Alabama Midland road, with headquarters at Montgomery.

Atchison, Topeka & Santa Fe.—J. H. Parsons has been appointed Superintendent of the Southern Division, with headquarters at Wellington, Kan., in place of Avery Turner, transferred. M. Emery has been appointed Master Mechanic at Arkansas City, Kan., vice D. C. Courtney, resigned.

Atlanta & West Point.—W. J. Taylor has been appointed General Agent of the company, with headquarters at Montgomery, Ala.

Augusta & Chattanooga.—A charter has been applied for in Georgia for this company by Allen D. Candler, of Gainesville; T. L. Gantt, of Athens; James M. Smith, of Smithonia, and R. M. Mitchell, of Augusta. Hon. E. T. Brown, of Athens, is attorney for the corporation.

Canadian Pacific.—Jas. O'Berne, formerly Car Accountant, has been promoted to the position of Superintendent of Car Service, with headquarters at Montreal, P. Q.

Chicago & Alton.—William Brown, of Chicago, has been elected to succeed the late Judge Beckwith as General Solicitor of the road.

Chicago & West Michigan.—W. A. Carpenter, having resigned the office of Traffic Manager of this road and the Detroit, Lansing & Northern and Saginaw Valley & St. Louis roads, to take effect Nov. 15, that office will be abolished after that date. All correspondence and reports, now forwarded to him at Detroit will be sent to M. W. Rose, Assistant General Freight Agent of the Chicago & West Michigan, at Grand Rapids, Mich., who will, until further notice, act in corresponding capacity for the Detroit, Lansing & Northern and Saginaw Valley & St. Louis roads. Wm. A. Gavett has been appointed General Agent of the three companies, with office at Detroit, and will assume the position Nov. 15. He will have charge of the freight and passenger business originating or received at Detroit.

Cincinnati, New Orleans & Texas Pacific.—At a meeting in New York, Nov. 7, the directors elected the following officers: Samuel Thomas, President; Charles Schiff, First Vice-President; Henry Fink, Second Vice-President; H. H. Tatem, Secretary and Treasurer; E. M. Colston, of Cincinnati, General Counsel.

Cleveland, Cincinnati, Chicago & St. Louis.—A. D. McLeod as Assistant General Freight Agent and W. R. Baldwin as Assistant General Passenger Agent will have immediate charge of the freight and passenger traffic, respectively, of the Cincinnati, Sandusky & Cleveland, and the Columbus, Springfield & Cincinnati division of the road, with headquarters at Sandusky, O.

Colorado Midland.—The stockholders met in Colorado Springs, Colo., Nov. 3, and the following Board of Directors was elected: Thomas Baring, George Magoun, George J. McCook, all of Santa Fe; J. J. Hagerman, of Colorado Springs; J. R. Busk, T. M. Davis, S. S. Sands, F. F. Thompson, Thomas E. Jevins, Gordon Norris, of New York.

Corpus Christi & South America.—S. H. Mallory, Vice-President and General Manager of the company, having resigned, he has been succeeded by P. Doddridge as Vice-President and John B. Armstrong as General Manager. J. J. Cocke has been appointed Chief Engineer vice D. J. Thayer, resigned. William Davis, late of the Galveston Western, has been appointed General Superintendent.

Danville & East Tennessee.—The following are the officers of the reorganized company: Gen. Thomas Ewing, of New York, President; T. W. M. Draper, of Norfolk, Va., Vice President and General Manager; H. A. Hitchcock, of Norfolk, Treasurer; Paul Gorham, of New York, Secretary. The Directors include the above officers and Barton Myers, of Norfolk; A. E. Bateman, New York; James P. Harrison and J. E. Reson, Danville, Va.

Erie & Shenango.—This company was chartered in Pennsylvania last week by Samuel B. Dick, Meadville, Pa., President; Samuel B. Dick, A. C. Huidekoper, John Dick and John E. Reynolds, Meadville; A. F. Hinlein and E. S. Templeton, Greenville, Pa.

Georgia Pacific.—C. P. Hammond, Acting Superintendent, has been appointed Superintendent of this division of the Richmond & Danville, with headquarters at Washington, D. C.

Grand Trunk, Georgian Bay & Lake Erie.—At the annual meeting of the shareholders of this company, held at Toronto, Ont., last week, the following directors and officers were elected: President, Sir Joseph Hickson; Vice-President, Col. Tisdale, M. P.; Secretary and Treasurer, J. C. Boyd, Simcoe, Ont.; James McMullen, M. P., Mount Forest; S. S. Fuller, Stratford. Ont.; Charles Stiff, Hamilton, Edmund Wragge, Toronto; L. J. Seargeant, Montreal.

Houston & Texas Central.—John Doran has been appointed Assistant Master Mechanic, headquarters at Corsicana, Tex., to succeed Charles H. Burns, promoted. P. Kinney has been appointed to be foreman of shops at Hearne.

Kansas City & Memphis Bridge Co.—The stockholders met at West Memphis, Tenn., Nov. 5, and re-elected the following directors: George H. Nettleton, Wallace Pratt, J. F. Smith and William Vance.

Kennebec Central.—The stockholders of the company held their adjourned annual meeting at Gardiner, Me., last week. The old Board of Directors was re elected as follows: H. W. Jewett, S. N. Maxcy, E. D. Haley, A. C. Stilphen, J. B. Dingley, Franklin Stevens, David Dennis, Weston Lewis, J. S. Maxcy. Weston Lewis was re-elected President; P. W. Winslow, Treasurer, and H. S. Webster, Clerk.

Lehigh Valley.—C. E. Webster has been appointed Assistant Chief Engineer of the company, with headquarters at the office of the Second Vice-President, South Bethlehem, Pa.

Long Island.—Charles R. Fitch has been appointed Assistant Superintendent. He will report to the General Superintendent. His office will be at Long Island City.

Los Angeles Terminal.—The officers of this company are: B. F. Hobart, President, St. Louis, Mo.; T. B. Burnett, Vice-President and General Manager, Los Angeles, Cal., and W. F. McClure, Chief Engineer, Los Angeles.

Louisville & Nashville.—B. M. Starks, in addition to his duties as master of trains on the north end of the North & South of Alabama, will act as Assistant Superintendent of that road and the Birmingham Mineral, in place of C. A. Davies, Assistant Superintendent, who is not able to attend to the duties of his office on account of sickness.

Louisville, New Orleans & Texas.—J. T. Harahan, having resigned the position of General Manager of this line, the heads of the transportation, roadway and motive power departments, heretofore reporting to him, will hereafter report directly to James M. Edwards, Vice-President. Mr. Edwards will probably assume the duties of General Manager. He held the position before Mr. Harahan's appointment.

Manhattan (Elevated).—At the annual meeting of the shareholders of the company, held in New York, Nov. 12, the old Board of Directors was unanimously re-elected as follows: Jay Gould, R. M. Gallaway, Russel Sage, Samuel Sloan, Sidney Dillon, George J. Gould, J. Pierpont Morgan, John H. Hall, Cyrus W. Field, Edwin Gould, Chester W. Chapin, S. V. White, and Simon Wormser. Jay Gould was re-elected President, R. M. Gallaway, Vice-President, and D. W. McWilliams Secretary and Treasurer.

Mexican Central.—W. A. Frost, formerly Auditor of of the Gulf division of the Atchison, Topeka & Santa Fe, has been appointed Auditor of the Mexican Central, with headquarters at the City of Mexico, vice G. F. Mayer, resigned.

Missouri Pacific.—James F. Jones has been appointed Superintendent of Terminals of the company to succeed Frank Stilwell, whose entire services are required by the Terminal Railway Association.

New Orleans, Ft. Jackson & Grand Isle.—J. Stans. Landry has been appointed General Freight and Passenger Agent, with headquarters in New Orleans. Mr. Landry has been Ticket Agent of the International & Great Northern road, at Galveston, Tex.

New Orleans & Northeastern.—The stockholders of the New Orleans road elected these directors at the annual meeting held last week: Henry Abraham, Jules Aldige, Frank S. Cond, D. Graff, C. C. Harvey, Harry H. Hall, John P. Richardson, R. M. Walmsley and Charles Schiff. The directors elected the following officers: Charles Schiff, President; C. C. Harvey, Vice-President; John G. Lynn, Jr., Secretary; H. H. Taum, Treasurer.

New York, Lake Erie & Western.—M. W. Maguire has been appointed Superintendent of the Susquehanna Division, with office at Susquehanna, Pa., vice J. H. Parsons, resigned.

New York, New Haven & Hartford.—At a meeting of the directors of the road Charles P. Clark, President, and E. M. Reed, Vice-President, were unanimously re-elected.

New York & Northern.—The annual meeting of the company was held at 32 Nassau street, New York, Sept. 12. These officers and directors were re elected: R. S. Hayes, President; H. F. Dimock, Vice-President; G. G. Haven, Jr., Secretary and Treasurer; Sherman Evarts, Attorney; H. H. Vreeland, General Superintendent; W. D. Basley, Auditor. Directors: C. T. Barney, J. J. Belden, A. M. Billings, George Coppell, Thomas Denny, H. F. Dimock, R. M. Gallaway, G. G. Haven, R. S. Hayes, William Mertens, O. H. Payne, George W. Smith and William C. Whitney.

New York, Pennsylvania & Ohio.—H. N. Donaldson, trainmaster of the Mahoning division, has been appointed Acting Superintendent of the division, vice Charles R. Fitch, resigned to go with the Long Island road. Mr. Donaldson has been employed on this division for 20 years. His headquarters will be at Youngstown, O.

Oregon Improvement Co.—The offices of General Superintendent and Chief Engineer has been consolidated. B. F. Bush has been appointed Chief Engineer and Superintendent, vice B. T. Carr transferred to be Assistant Superintendent of the Columbia & Puget Sound road, vice A. Branin, transferred.

Port Arthur, Duluth & Western.—The following are now the officers of this company: President, Alexander Middleton; Chief Engineer, George H. Middleton, and Solicitor, Thomas A. Gorham, all of Port Arthur, Ont.

Port Reading.—This road was chartered in New Jersey last week as a branch of the Philadelphia & Reading by A. A. McLeod, I. A. Sweigard, W. R. Taylor, S. Jones, Robert S. Davis, John Walker, Jr., all of Philadelphia; Nathan Francis, of Magnolia; S. Garwood, of Williamstown; Howard T. Naisly, H. P. Felton, John W. Klint, Charles H. Davis and Casper Bodine, of Camden. The following have been elected officers: President, A. A. McLeod; Treasurer, W. A. Church; Secretary, W. R. Taylor; Chief Engineer, H. K. Nichols, all of Philadelphia.

Pullman's Palace Car Co.—F. H. Crane, formerly General Manager of the Woodruff Sleeping Car Co., and who has been District Superintendent of this company in special charge of the lines running over the Chicago, St. Paul & Kansas City and the Wisconsin Central roads out of Chicago, has been appointed Division Superintendent for the company in Kansas City, Mo.

The Eastern and Southern divisions of the company have been united, and J. S. Merrill, Superintendent of the Southern Division, has been made Superintendent of the consolidated district, with headquarters at 20 Broad street, New York City.

Silver Creek & Dunkirk.—The stockholders are: W. K. Vanderbilt, C. Vanderbilt, F. W. Vanderbilt, H. McK. Twombly, E. D. Worcester, D. W. Pardee, John Newell, George C. Greene, Charles H. Lee, S. Howes, E. A. Hanay, C. D. Murray, R. J. Gross, M. L. Timman, H. T. Murray, J. R. Newton, Philip Blodgett, P. P. Wright, C. P. Leland, W. H. Conniff, G. H. Kimball, William Bookstaver, C. G. Getzen-Danner, Charles B. Church, N. Bartlett, James Tillinghast, and W. T. Colman.

Southern Central (New York).—At the annual meeting at Auburn, N. Y., Nov. 12, the following directors were elected: Thomas C. Platt, John N. Knapp, E. P. Wilbur, William Stevenson, Henry L. Storke, John A. Thomas, James G. Knapp, D. H. Marsh, Royal W. Clinton, John Taylor, Dexter A. Smith and E. R. Robinson.

State Line.—The incorporators of this Pennsylvania company are: Seymour F. Alexander, President; B. F. Sherman, U. F. McCann, Willard Hickok and J. J. Waterman, of Genessee Falls, Potter Co., Pa.; Charles Day, Horace M. Browning and Rufus Scott, Wellsville, N. Y.

Suburban Rapid Transit Co.—The annual meeting of the stockholders of the company was held in New York, Nov. 10, and the following Board of Directors was re-elected: J. Hood Wright, President; J. Pierpont Morgan, Cyrus W. Field, Samuel Spencer; Jay Gould, Russell Sage, John H. Hall, Charles Lanier, George Bliss and L. F. Pomeroy, Secretary and Treasurer.

Tennessee River, Ashville & Coosa.—The officers of this company are: President, Leroy F. Box; Vice-President and General Manager, A. Johnson, and Chief Engineer, T. M. T. McKennan. Ashville, Ala. M. O. Crane, 74 Wall street, New York City, is Agent.

Toledo, Ann Arbor & North Michigan.—C. Stein has been appointed Roadmaster of the line between Owosso and Copemish, Mich., with headquarters at Mt. Pleasant, Mich.

Waco, Lampasas & Llano Iron.—The officers of this Texas company are: F. R. Malone, President; Charles E. Longcape, Philadelphia, Vice-President; E. M. Longcape, Lampasas, Tex., Treasurer and Auditor, and W. S. Dorland, Secretary. The Philadelphia office is at Room 54 Forrest Building, Philadelphia.

West Virginia & Pittsburgh.—A. M. Stone has recently been appointed Assistant Superintendent, with headquarters at Weston, W. Va.

Wisconsin Central Co.—At the annual meeting of the company at Milwaukee, Wis., Nov. 6, the following were elected directors: Edwin H. Abbot, Frederick Abbot, Howard Morris, Thomas J. Hyman, Samuel R. Ainslie, Robert W. McGuire, Henry F. Spencer, Jeremiah Smith, Eustace J. Fitz, John T. Anderson and Joseph H. Wellman. The directors elected the following officers: Edwin H. Abbot, President and Treasurer; Frederick Abbot, Vice-President and Assistant Treasurer, Milwaukee; Thomas J. Hyman, Auditor and General Accountant; Howard Morris, Secretary and General Solicitor; Henry H. Spencer, Assistant Treasurer and Assistant Secretary.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Baltimore & Drum Point.—The County Commissioners of Anne Arundel County, Md., have been enjoined by the Circuit Court from issuing any part of the $200,000 bonds subscribed by the county in favor of the railroad company. The court holds that the election at which the bonds were voted was illegal, as the notice of the election was not published the required length of time.

Baltimore & Eastern Shore.—A survey has been commenced for a branch of this road from Easton to a point on the Choptank River opposite Cambridge, Md.

Bellingham Bay & British Columbia.—The large bridge across the Fraser River is very nearly completed, and by the latter part of the month the work on this section will be entirely finished and the connection with the Canadian Pacific at Mission, B. C., will be made Dec. 1. The work is being rapidly pushed, and the bridge across the Nooksack will undoubtedly be finished this month. Tracklaying will then commence, and the work will be pushed until completed. Ships with the rails and other rails are expected to arrive in a few days. The grading has been about completed on the entire line.

Brunswick & St. Simons Coast Line.—This company has been recently formed in Georgia with a capital stock of $150,000 to build a road between Brunswick and St. Simons Island, Ga. The line will be about 25 miles long. R. H. Hirshfield of Brunswick is a director.

Calgary & Edmonton.—This road is now fully graded and the rails laid for 70 miles north of Calgary Alberta. It is expected that the road to Red Deer, 100 miles from Calgary, will be graded in a few days, there being only a small gap in Keith & McKenzie's contract uncompleted. Three mogul engines are now employed on construction trains and the round house for four engines is about erected.

Canadian Pacific.—Tracklaying has been resumed on the Brandon-Morris branch and the line is to be completed to Melita, Man., 40 miles from Souris, this fall. The company is to build a handsome station at Souris immediately.

Castle Valley.—This road, which was referred to last week, is to be built from Price, Utah, to large coal and iron fields located about 50 miles south of that town. It is stated that the route is through a level country except on five miles through a cañon, where the grade will be 1¼ per cent. The expense of construction is estimated at $8,000 per mile. Part of the road has been graded by a former company, and the survey is now being made on the uncompleted portion. The Rio Grande Western has been asked to undertake the construction of the line. B. W. Briggs, of Salt Lake City, is President.

Chicago, St. Paul, Minneapolis & Omaha.—The grading and tracklaying on the extension north of Randolph, Neb., to the Missouri River, 21 miles, has been completed and the contractors have moved their material to other points.

Cincinnati, Wabash & Michigan.—The track on the extension from Anderson to Rushville, Ind., has been laid to a point about three miles north of the latter town, where it will connect with the Cleveland, Cincinnati, Chicago & St. Louis. The grading at the Fall Creek cut will be completed next week. Over half the

40 miles of new line is ballasted, and as the connection will be finished within a week regular trains will probably be put on between the two points about Nov. 25. The connecting link between the main line and the Detroit and Eel River branch of the Wabash will be ballasted and ready for trains to pass over in a few weeks.

Columbia Railway & Navigation Co.—This company filed a charter in Oregon last week to build extensions of the lines authorized by the charter filed in Washington early in October. The company proposes to build from Portland down the Columbia River to the Pacific Ocean, and branches to Gray's Harbor, Shoalwater Bay and Willipa Harbor. The capital stock is $5,000,000 and the principal office is to be at Portland. The incorporators are G. W. Post, J. V. W. Montague and W. A. Woodroffe.

Danville & East Tennessee.—The construction company organized to build this road has placed several parties of engineers in the field on the survey from Danville, Va. The western terminus of the line has not yet been selected, but it will be either Bristol or Johnson City, Tenn. The route is through a fine hard wood timber section and will make accessible large tracts of coal and other mineral land in Virginia and Tennessee. The construction company will receive $150,000 of the bonds of Danville and $110,000 of the bonds of Bristol which have been voted for building the line. T. W. M. Draper, of Norfolk, is General Manager.

Delaware River & Lancaster.—This road is now in operation for freight traffic between St. Peter's, Pa., on the Wilmington & Northern, and Phœnixville, on the main line of the Philadelphia & Reading, a distance of about 12 miles. The road connects with the Philadelphia & Reading at French Creek Junction, and has running rights over the two miles of the Pickering Valley branch of that road between French Creek and Phœnixville. The last mile of track will be laid this week. About 116 laborers are employed on this work and on ballasting. The largest bridge is a one span wooden Howe truss, 86 ft. long. George Potts, 40 Wall street, New York, is the contractor. It is proposed to put on passenger trains by Nov. 15. A survey is now being made for an extension of the road from St. Peters westerly about 34 miles to Lancaster. When the road is completed to that town it will form a cut off for the Philadelphia & Reading between Philadelphia and Lancaster. The engineers have completed the survey on 22 miles. The stations on the present line are: St. Peter's, French Creek Falls, Knauertown, Coventryville, Pughtown, Roberts, Borael, Sheeders, Vincent, Wilson and French Creek Junction.

Denver & Rio Grande.—The company has commenced to operate the Villa Grove branch, which was built during the past summer from Villa Grove south to Alamosa, Col., a distance of 55 miles. The old route from Denver and Pueblo to Alamosa and south and west of that point via Veta Pass will be abandoned, and trains will be run via Salida and the new branch.

Drayton Harbor, Lynden & Spokane Falls.—The charter, surveys and other property of this company have been purchased by Portland people, who propose to reorganize under a new name and commence the construction of a line from Drayton, Wash., up the Nooksack Valley.

Erie & Shenango.—This company was chartered in Pennsylvania last week to build a road seven miles long from a junction with the New York, Chicago & St. Louis near Girard, Erie County, to a junction with the Pittsburgh, Shenango & Lake Erie near Cranisville. The capital stock is $100,000. Samuel B. Dick, of Meadville, Pa., is President.

Fort Worth & Rio Grande.—The track on the extension from Dublin to Comanche, Tex., a distance of 22 miles, has been completed and passenger trains have been running since Oct. 27. The company is now considering the route for the further extension from Comanche, but the matter will probably not be decided for some time. It is probable that the extension may be built to Llano, which is situated in the centre of the iron fields of Llano County.

Georgia Midland & Gulf.—Engineers are running a preliminary survey for an extension of this road from McDonough to Atlanta, Ga., about 25 miles, and it is expected they will complete the work in about two weeks. This is the second or third line that has been surveyed between these points. When the reports of the various surveys have been made and examined, the chief engineer will determine what route to build on.

Grand Trunk.—The rails on the second track has been laid from Belleville to Napanee, Ont., 22 miles, and the company does not propose to continue the work any further this autumn. The heavy grade near Napanee has been reduced and the ballasting will be completed this week. The company has commenced the building of a loop between the Toronto branch and the track of the Northern & Northwestern division at Burlington, Ont. When this loop is completed it will give the company a belt line around Hamilton Beach; that is, trains will be able to start from the Hamilton station and make a complete circle of the bay.

Great Northern.—The location for the line from Seattle to Portland is said to have been completed, and a good part of the right of way has also been secured. The site for the bridge across the Columbia River has been decided. It is at a point where the river is 50 ft. deep, and gives a good foundation. The bridge will be 2,800 ft. long.

Hamilton & Kingston.—This road will probably be opened between Kingston and Hamilton, Caldwell County, Mo., on Nov. 15. The distance is about 8½ miles. The road is built to reach the coal mines of the Tom Creek Coal Co.

Hereford.—This company is applying to the Dominion parliament for power to extend its road to Levis, Quebec, by an Independent line, or by connecting with the Intercolonial or Quebec Central roads.

Houston, Central Arkansas & Northern.—The larger part of the grading between Columbia, La., and the Red River has been completed, and the contractors, Henry, Forrest & Co., of St. Louis, expect to commence tracklaying from Riverton, the present terminus, in a few days. They will use steam tracklayers.

Interoceanic.—Hampson & Sullivan, of the City of Mexico, the subcontractors for this road, have about 3,000 laborers employed on the section between Jalapa and Vera Cruz, Mex. Most of the grading has been finished between these points, with the exception of 10 miles, which includes some heavy work. Heavy rains between Jalapa and Rinconada has delayed the work recently, but no further trouble is expected from this account. Track has been laid for 40 miles from Vera Cruz towards Jalapa, and this work has also been begun recently from the latter point towards Rinconada. The line is now being operated from the City of Mexico to Jalapa, and it will probably be ready for traffic to Vera Cruz in February. Within the next two months the masonry and grading on the Izucar de Matamoras branch from Puebla will be completed to Chiautla, 33 miles from Puebla.

Leavenworth & St. Joseph.—The tracklaying on this extension of the Chicago, St. Paul & Kansas City has been greatly hiddered on account of the delay in receiving the rails from the steel works. The engineers have been informed that the last consignment has been shipped and will soon arrive at St. Joseph. The heaviest work on the line has been the cut near Dearborn. The track has been laid from Bee Creek Junction eight miles south of St. Joseph, where the junction is made with the present line, for about 10 miles, to a point near Dearborn. This leaves 13 miles yet to be laid to complete the line to Beverly Junction on the Missouri River opposite Leavenworth, Kan., where the line connects with the Kansas City, Wyandotte & Northwestern. The following stations will be established: Willow Brook, Faucett, Dearborn, New Market, Woodruff, West Platte, Beverly Junction and Leavenworth.

Los Angeles Terminal.—This road is projected to extend from San Pedro Bay through Los Angeles to Hueneme, in Ventura County, Cal., with branches to Pasadena, Long Beach and Santa Monica, about 140 miles in all. It is also proposed to develop large terminals in the city of Los Angeles. The Los Angeles, Pasadena & Glendale road has been purchased and the location made to San Pedro; the line through the city of Los Angeles is under construction, including four miles of level of the Los Angeles River. The line to San Pedro harbor will probably be completed by June, 1891. That part of the line is not difficult to build. It has maximum grades of one-half per cent. and curves of six degrees. There are no important bridges on the San Pedro line, but there will have to be 1,000 ft. of docks in San Pedro harbor. The line from Los Angeles to Hueneme has not yet been surveyed, but will have 10 or 12 miles of mountain work, with some tunnels. The company is raising its funds by stock subscriptions, and does not expect to issue any bonds.

Macon & Atlantic.—One of the surveying parties is running a second line from Hardeeville, S. C., to Fort Point. The line strikes the Charleston & Savannah Railroad just south of Hardeeville station and runs parallel with it northward for a half mile, and thence east to the coast. It is probable that other lines will be run. Over 200 miles of the road is actually under construction, and 50 miles northwest of Macon is completed and in operation.

Macon & Birmingham.—Tracklaying on road was completed to Thomaston, Ga., Nov. 7. The track is now laid from Macon to the Columbus & Rome road, except about two miles from Thomaston, west. This gap will soon be closed.

The State Supreme Court of Georgia has reversed the decision of the lower court which granted an injunction against this road on the application of the Macon & Dublin to prevent the company from building a road on the route surveyed between Macon and Dublin, Ga., or within 10 miles on either side of the partially graded road of the Macon & Dublin. When the injunction was granted the grading on the 30 miles between Macon and Dublin was suspended and the work continued east and west of the two towns.

Mary Lee Coal & Railway Co.—The rumored purchase of the railroad of the company and its extension to the Thomas furnaces by the Louisville & Nashville is denied by the officers of the company. No proposition has been made for the purchase of the road, and it would not be entertained if made. The company is now extending their road from Lewisburg to Mine No. 2, about 1½ miles, and also a half mile southwest to new coke ovens.

Mexican.—The Pachuca branch will probably be opened for freight and passenger traffic Nov. 15 or very soon after that date.

Mexican Gulf, Pacific & Puget Sound.—Charles Seymour, recently appointed Chief Engineer of this road, is making a reconnoissance of the Florida division from Pensacola north, accompanied by the President, S. N. Van Praag. The road is projected to extend from Pensacola, Fla., to Memphis, Tenn., supposed to be about 500 miles, but the exact distance will not be known until the surveys have been completed. The two most important bridges along the line will be over the Warrior River, on the line of Marengo and Greene counties, Ala., and over the Alabama River, on the line of Monroe and Clarke counties, Ala. The Secretary of the company is J. H. Cross, of Demopolis, Ala.

Mexican Northern.—The track has been laid for a distance of 15 miles from Escalon, Mex., and the grading has been finished on 50 miles. About 180 teams are now at work with scrapers. Nearly all the grading is earthwork, easy to build. Several engines have arrived at Escalon, and these are used in the construction work. About a mile of track is laid each way and nearly that amount of grading. Hampson & Sullivan, of the City of Mexico, are the contractors.

Mexican Roads.—H. E. Dennie and Sydney Marshall have been authorized by a contract with the Department of Public Works to build a system of branch lines in the districts of Patzcuaro, Tacámbaro, Uruàpam, Ario and Apatzingan, State of Michoacan, connecting with the Mexican National at a point between the cities of Morelia and Pitzcuaro. The main traffic will be lumber and products of southern Michoacan. The construction must be begun within a year and be completed within eight. A right of way of seventy metres in width is granted.

Mississippi & Little Rock.—The company is making rapid progress on its road through the southern part of Lonoke County, Ark. A length of 31 miles has been graded and ties delivered. Bridges have been built on ten miles of the road, and track laid on eight miles. The road is now graded to Bayou Meto.

Missouri, Kansas & Texas.—John P. Hughes, of Fort Worth, Tex., has been awarded the contract for the extension of the Dallas & Waco road from its present terminus at Waxahachie, south to Hillsboro, Tex., a distance of 35 miles.

Mobile, Jackson & Kansas City.—The agreement made with the Anglo-Southern Construction Co., of New York, for the construction of this road between Mobile and Jackson, Miss., has been rescinded as the directors do not consider that the company is prepared to carry out its contract. A meeting will be held in Mobile, Ala., at which the organization of the Mobile Construction Co., a local company, will be completed.

Montana & Wyoming.—The directors of the Montana, Wyoming & Eastern, which was recently incorporated in Montana, have changed the name of the road to the Montana & Wyoming, as a company had been previously incorporated under the former name. A survey is being made from Helena southeast to the Castle Mountains and the location for 10 miles of the line has been filed with the state officers.

Montreal & Western.—Ten miles of track on this road have been laid from Ste. Jerome on the Canadian Pacific and another ten miles graded. This road will extend north and west to Le Desert, 70 miles from its southern terminus, where it will cross the Ottawa & Gatineau Valley road.

Nashville, Chattanooga & St. Louis.—Allison, Shaffer & Co., of Chattanooga, have closed the contract to build the extension of the Tennessee & Coosa from near Guntersville to a connection with the main line. It is not yet determined whether the Tennessee will be bridged at Guntersville or Manchester. The road is to cross the river at one of these places and thence extend by the Bell factory route to the main line. The entire line is to be completed by Sept. 1, 1891. J. A. Richardson, of Attalla, is engineer in charge of the work for the contractors.

Nashville & Mississippi Delta.—It is expected that the survey of this road will be finished from Okolona west to Grenada, Miss., 60 miles, by Nov. 15. The survey may be continued from the latter point west to the Mississippi River. The company has secured most of the right of way to Grenada. The charter was granted by the last state legislature for a line through the counties of Chickasaw, Calhoun and Grenada to the Mississippi River. The road will probably be built by J. W. Worthington & Co., of Birmingham, Ala., although it is not known that the contract has been formally signed. The survey is being made by John S. Foster, Chief Engineer.

New Albany Highland.—The grading on the first two miles of this road in New Albany, Ind., will be finished in a few weeks and work will then be suspended till spring, when the track will be laid. There will be about 600 ft. of trestling on the line. The grade will be 150 ft. per mile. The road is being built for suburban purposes and the construction will be paid for from subscriptions to the capital stock. It is not proposed to issue any bonds. J. F. Gebhart is President.

New Orleans & Northwestern.—Most of the engineering parties engaged in surveying the line north of Rayville, La., have been disbanded and all construction work has been suspended for the winter. The company will probably resume work on the extension to Bastrop in the spring.

New Roads.—Several engineering parties employed by the Colorado Fuel Co. have been engaged for several months in making a preliminary survey for a road which that company proposes to build from Glenwood Springs through Carbondale, Col., and south for a distance of 50 miles. The survey will not be completed until next month. The road is projected to open the coal lands owned by the company in the vicinity.

The directors of the Mountain Incline road at Montreal, Quebec, are contemplating extending the line to St. Lawrence street. This it is estimated would involve an outlay of $75,000.

The grading has been completed, and the rails are to be laid at once on the road being built from the Egypt coal mine to a point on the Seaboard Air line some three miles from the town of Sanford, N. C. The distance is about nine miles. Samuel A. Henszey is President of the Egypt Coal Mine Co., which is building the road.

Notice has been given that an application will be made to the Dominion Parliament next session for an act to incorporate a company to construct a road from a point on the Canadian Pacific between Dog Lake and Sudbury, Ont., thence by way of the valleys of Moose River and its tributaries to James Bay and Hudson Bay.

J. J. Falstad, of Snohomish, Wash., is making a survey for a railroad from the Silver Creek country to Snohomish City.

Northern Pacific.—The tracklaying machines used on the branch from Pullman, Wash., southeast to Lewiston, Idaho, are laying about two miles of track daily between Moscow and Kendrick. The work has been delayed at the former town for some time, but it will now be continued until completed to Lewiston. That part of Lewiston fronting on the Snake River is being riprapped.

Northeast Pennsylvania.—Work on the New Hope extension is proceeding rapidly, and probably before spring the road will be ready for operation. It extends from New Hope to Hartsville, Pa., a distance of over 15 miles. When completed the road will be almost an air line between New Hope and Philadelphia, and about 22 miles shorter than by any other line. A line has been surveyed from New Hope to Easton, and work on its construction will probably be commenced next year. The extension, after leaving Hartsville, runs through a picturesque and fertile section of Bucks County, along the Neshaminy and Buckingham valleys to New Hope. The stone work on the various bridges is finished and the grading done, and the work of ballasting and laying the 70-lb. rails is progressing. The ten stations between Hartsville and New Hope are as follows: Warwick, one mile beyond Hartsville; Windermere, 1.85 miles; Grenoble, 2½ miles; Kirk, 4 miles; Linghocken, 6⅛ miles; Buckingham, 9 miles; Bycot, 10½ miles; Lahaska, 11¾ miles; Huffnagle, 15 miles, and New Hope.

Ohio & Mississippi.—The company has just completed the Cincinnati & Bedford branch, 6¼ miles long, extending from the main line at Riverdale to the Bedford, (Ind.), stone quarries. In addition to this a track, two and a half miles long, has been built into Rock Lick Creek Valley for the same purpose. The road has been expending large sums in improving the road bed. Heavier iron bridges are being put in on the main line and plate girder structures are superseding pile trestle openings up to 60 ft. Twenty miles of new 67-lb. steel has been laid recently. The entire line from

North Vernon to Cincinnati is now laid with this size of rail. This portion of the road has the heaviest traffic.

Ottawa & Gatineau Valley.—This company expects to have the first 20 miles of its road to La Peche finished before the end of the year. Tracklaying is now in progress on the first 10 miles from Hull to beyond Chelsea, Que. The company is making arrangements with the Canadian Pacific to cross its bridge at the Chaudiere from Hull, and thus make Ottawa the terminal point.

Pecos Valley.—The grading on this road was commenced at Pecos, Tex., last June, and up to Nov. 1 over 75 miles of the grading had been finished and the track laid for 50 miles. This leaves only 15 miles of grading to be done to complete the line to Eddy, N. M., which will be made the temporary terminus. Next year the line will be extended north to Roswell, 190 miles from Pecos.

Phillips & Raingley.—The track has been laid on about 18 miles of this road, from Phillips to a point beyond Reddington, and construction trains are running for this distance. All the grading has been completed, with the exception of a few miles on the northerly end, and the road will probably be ready for operation during January. About 500 laborers are employed. The clearing of the forest trees and the heavy grubbing have been the most expensive part of the work. The rolling stock is now being purchased. Brown Bros. & Co. are the contractors.

Pittsburgh, Akron & Western.—All the grading on the eastern division has been finished, with the exception of about 10 miles near Akron, O., where the work is most heavy. The track has been laid to Medina, about 85 miles from Carey. This leaves 25 miles to be laid to complete the entire road, which will be 160 miles long, from Delphos. It is expected to have all the track laid this winter.

Port Arthur, Duluth & Western.—Middletown & Conmee, of Port Arthur, Ont., who have the contract for building the first 50 miles of this road to Port Arthur, have about 400 men and 40 teams employed on the work. They have the grading completed to the end of the fortieth mile and the track has been laid for 30 miles. The location has been completed for 50 miles and the contracts are let for this distance. Preliminary surveys have been made to the international boundary line in the direction of Duluth, a distance of 85 miles from Port Arthur. The work on the section located averages 7,000 cu. yds. of earthwork per mile. The maximum grade is 66 ft. per mile and the maximum curves eight degrees. The most important bridge is that at the Kamnistiqua River, which has four spans 80 ft. long. It is a wooden Howe truss, built on cedar cribs.

Port Huron & St. Clair River.—A new charter has been granted this company, with a capital stock of $200,000, to build a standard gauge road from Port Huron to Marine City, Ont. The stockholders are: Henry McMorran, Nelson Mills, O'Brien J. Atkinson, John G. O'Neill, Geo. Brooks, Wm. Hartsuff, Marcus Young. Henry McMorran is President, and John G. O'Neill, Secretary and Treasurer.

Port Reading.—This company was chartered in New Jersey last week by the Philadelphia & Reading Railroad to build the proposed branch of that road to New York Bay, for which several surveys have been made. The new extension will begin at a point on the Bound Brook Railroad about 1,000 ft. west of the crossing of the Easton & Amboy division of the Lehigh Valley road in Somerset County and terminate at a point on the Arthur Kill on Staten Island Sound near Tuft Point, in Middlesex County. The capital stock is $2,000,000. Port Reading is the name decided upon for the new terminal of the road on the Arthur Kill, six miles above Perth Amboy. The plans of the road have been approved by the Board of Directors and filed in the office of the Secretary of State of New Jersey. Advertisements for bids for the construction of the road have been issued. It is the intention of the management to push the road to an early completion. It will be 20 miles long.

Quebec Central.—The line from Tring, Que., to Lake Megantic, near the Maine state line, has been surveyed nearly the whole distance, and is expected to pass through Tring Village, St. Ephrem, Forsyth, St. Sebastian, and thence to Lake Megantic on the Canadian Pacific. The Northern Terminal, however, is not yet determined. Tring station may not be the junction with the main line, as it is thought that by a slight deviation from Tring Village a much better grade and more direct line toward the objective point may be found. Only the preliminary survey is now going on, and that is not yet finished; some 40 miles has been thus surveyed. The total length may be about 52 miles. The grades are not expected to exceed one per cent., nor the curves three degrees. The work will not be heavy nor difficult. The bridges, of which there will be very few, will not exceed 80 ft. span. The contracts for building the line will probably be let next spring.

Richmond, Nicholasville, Irvine & Beattyville.—The division of this road between Versailles, on the Lexington division of the Louisville Southern and Richmond, Ky., 37 miles, has been transferred to the East Tennessee, Virginia & Georgia, the lessee of the former road, and it will hereafter be operated as a division of the East Tennessee system. Passenger and freight trains will be put on between Louisville and Richmond, 150 miles, this week. Work is in progress on the last division of the line between Richmond and Beattyville, 23 miles. The distance between Versailles and the latter point is 95 miles.

Rio Grande Southern.—It is expected that the track will be completed from Dallas south to Telluride, Col., in a very short time. The road is now about six miles from the town, near the foot of the hills on which it is built. Only a small force is employed at present, and the men are concentrated on two miles of the South Fork. The grading beyond Telluride, on the South Fork, has been finished to a point between Howard and Lake Forks, but it will be impossible to finish the work to Rico this year, which the company expected to do when the construction work was commenced.

Roanoke & Farmville.—A company is being organized under this name by residents of Brookneal, and Campbell county, Va., to build a road from Farmville up the Staunton River Valley to Roanoke. The next State Legislature will be applied to for a charter. The route is from Farmville, Prince Edward County, Charlotte County near Aspenwall, through Campbell near Brookneal and Leesville; thence through Bedford County and Roanoke County to Roanoke City. G. M. Wickliffe and R. L. Poindexter, of Brookneal, are interested.

Roanoke & Southern.—The contract for grading the road from the summit of the Blue Ridge Mountains to Roanoke, Va., about 13 miles, has been awarded by the Virginia & North Carolina Construction Co. to Z. C. Moorman, of Lynchburg, Va., and E. Cason & Co.

Rumford Falls & Buckfield.—The permanent location of the extension from Canton west to Rumford Falls, Me., a distance of 15 miles, will be made this winter, and it is expected that the grading and tracklaying will be finished during the early part of next spring. Brown Brothers and several other contractors have sent in bids on the work, but it will probably not be awarded for some time.

San Jose & Southern.—The surveys for this road now in progress from Dumbarton Point, near San Jose, in Santa Clara County, south toward Los Angeles, will probably be completed in two months. E. P. Webster, of San Jose, is one of the directors.

Seville Southern.—This company has filed an amended charter in Florida extending its powers so as to include the construction or leasing of a road already constructed from a point on the St. Johns River, near Astor, Lake County, through the counties of Lake, Orange, Polk and De Soto to Charlotte Harbor. The newly elected officers are: J. R. Parrot, President, and F. M. Day, Jr., Secretary. The office is in Jacksonville.

Silver Creek & Dunkirk.—A company has been organized to build a road between Silver Creek and Dunkirk, N. Y., about nine miles. A survey is now being made, and it is expected that the road will be built with a maximum grade of 16 ft. per mile. The present double track road of the Lake Shore & Michigan Southern, between these points, is overcrowded, and it is stated that that company has incorporated the new road to build on a new route, rather than to reconstruct the old line, which has not a very good location.

Sioux City & Forest City.—A survey is being made by Jacob Brown for an extension of this road from Forest City, on the Missouri River, west to Rapid City, in the Black Hills. The road will probably be operated by the Fremont, Elkhorn & Missouri Valley when it is completed, and as the latter company has allowed its right of way across the Sioux Indian Reservation from Pierre to lapse, the new survey is taken as indicating that if any line is built across the reservation it will be from Forest City.

Southern Pacific.—The grading and tracklaying has been entirely finished on the Knights Landing Branch and as soon as the ballasting and a few trestles have been completed the line will be ready for operation. Trains are running on the Oakdale and Merced Branch from the latter place to the Merced River. As soon as the bridge across that stream is erected the tracklaying will be resumed. The bridge at Tuolumine is partially completed, and the construction work on the north end of the line is proceeding very rapidly. The entire 44 miles of road will be in operation before next January. Work was commenced last week on the branch to San Ramon, Cal., 21 miles from Avon, for which Fitzgerald Bros., of Alameda, Cal., have the contract. The intermediate towns are Concord and Danville. The maximum grade is 53 ft. per mile and the maximum curvature 10 degrees.

State Line.—A charter has been granted in Pennsylvania to this company to build a road extending from the New York and Pennsylvania state line near its intersection with the Genesee River, southerly to Perrysville, Potter County, a distance of two miles. The capital is $20,000, and Seymour F. Alexander is President.

Tacoma, Olympia & Gray's Harbor.—The track has been laid on the first 10 miles from Lakeview toward Olympia, Wash. The heaviest grades on the line are along the Nesqually River. On both sides of the river are steep hills, the sides of which will have to be cut into very deeply in several places. The bridge across the Nesqually River will be completed in three weeks. Most of the work between Nesqually and Olympia is already finished. The grading will be completed and the line ready for tracklaying in a month. Work on this part of the road has been delayed a month by injunction suits, which have now been settled. Several pile drivers are at work between Olympia and Nesqually building bridges in various places along the road.

Taylor, Georgetown & Western.—The charter for this road will be filed in Texas in a few days, and surveys will then be commenced, and right of way secured. The capital stock is $300,000, of which five per cent. has been paid in. The road is to extend from Taylor to Georgetown, connecting with the Austin & Northwestern near Liberty Hill, a distance of 30 miles. Enough stock is said to have been taken in Georgetown and Taylor to insure the early completion of the first 30 miles of the road. It will ultimately be extended west to Llano and east to Somerville. A. V. Doak, of Taylor, is President, and G. W. Glasscock, of Georgetown, Vice-President.

Tennessee River, Ashville & Coosa.—This road is being surveyed from a point near Lock 3 on the Coosa River, westerly toward Ashville and Whitney, on the Alabama Great Southern and northerly to a point on the Tennessee River, a distance of about 100 miles. The location is in progress between Whitney and the Coosa River, and the first three miles to Ashville is about ready for tracklaying. The company has about 100 men and 40 teams at work. The heaviest work will be in the divide between the Palmetto Creek Valley and Beaver Creek, on the eastern division, and through the Blount Mountains on the northwest. Several Howe truss bridges will be necessary, but none with spans greater than 56 ft. About 1,000 ft. of trestle work will also be built. Some of the rolling stock has already been delivered. This comprises one locomotive for construction work, 20 platform, and a similar number of box cars, and a few coal and ore cars.

Toledo, Columbus & Cincinnati.—The grading for the extension from Kenton to Ridgeway, O., is completed and tracklaying has begun. It is expected that by Nov. 5 the road will be completed to a connection with the Cleveland, Cincinnati, Chicago & St. Louis at Ridgeway.

Toledo & Ohio Central.—The roadbed between Toledo and Fostoria, 35 miles, is being widened previous to the laying of a second track, which it is expected to complete next spring.

Union Pacific.—Several parties of engineers have been engaged for several months past on surveys between Denver and Colorado Springs, about 80 miles, with a view of changing the line of the Union Pacific, Denver & Gulf between these points. The company has not yet come to any decision in regard to the matter, and it is not likely that any further work will be done upon it for a considerable period. The route which has been surveyed passes easterly of the present line and more closely parallels the Denver & Rio Grande and Atchison, Topeka & Santa Fe. It also passes through Colorado Springs, which is not reached by the present line.

The report that the company intended to build a branch from Omaha north along the Missouri River to Sioux City, Ia., is denied. No surveys have been made for the line, and it has never been discussed.

It is expected that the Elgin branch will be opened for traffic its entire length this week. The branch extends from La Grange north to Elgin, Or. Trains have been running to Island City for some weeks, but the opening of the line beyond that point has been delayed by the erection of the bridge across the Grand Road River.

Work is now progressing favorably on the Olympia, Tacoma and Seattle branch of the road. The heavy fills on the low lands along the Columbia River are nearly completed, and also the heavy rock work at Martin's Bluff. Tracklaying will begin in February. The company is now letting the contract for the large cut near Olympia. It will be 110 ft. deep and 225 ft. wide at the top. The material excavated, amounting to 200,000 yards, will be used to grade station grounds on the city front.

Utah Central.—This company has purchased the franchise of the Provo City Railroad, which was authorized to build through the Provo Cañon to the town of Provo, Utah. The contracts were let this week for completing a branch of this road from a point near Heber City and down the Provo River through the cañon to the town, a distance of about 25 miles.

Victoria, Port Crescent & Victoria.—The locating survey has been completed from Port Crescent, Wash., southwest for a distance of 22 miles from that point. The survey is being continued toward Chehalis. Bids have been received for the clearing on the first 12 miles, and this work will be commenced immediately.

Waco, Lampasas & Llano Iron.—The preliminary survey has been made between Llano and Lampasas, Tex., a distance of about 41 miles, and the engineer, C. A. Gilchrist, is now running the survey between Waco and Llano. The road is projected to extend from Llano, via Lampasas and Gatesville, to Waco, a distance of 140 miles, with branches from Llano to various iron mines in Llano County. It is proposed to build the section from Llano to Lampasas at once. The financial arrangements are reported completed for building from Llano to Lampasas, and negotiations are now pending for money to complete the whole line. The road is projected by C. E. Longcope, of Philadelphia, and Alexander McCline, of Columbus, O. They have asked the following subsidies from points on the line: Llano, $100,000; Lampasas, $65,000; Gatesville, $35,000; and Waco, $75,000. Two of these subsidies have been guaranteed. The town of Waco is also asked to secure right of way from the southern border of McLellan County to the city, 30 miles, and also four blocks within the town for station grounds.

Washington Central.—The survey for the western extension of this branch road of the Northern Pacific has reached Waterville, Wash., on the Columbia River, a point about 60 miles southwest of the Grand Coulee, and about the same distance east of the Cascade Mountains, across which it is proposed to locate the line, in the direction of Anacortes, on Puget Sound.

Wheeling & Lake Erie.—The Steubenville extension was completed to that point Nov. 6. The rails have been laid to the southern line of the town for some weeks, but owing to right of way difficulties and injunctions secured against the company the work through the city has been seriously delayed. Tracklaying will probably also be soon completed on the extension along the bank of the Ohio River from Steubenville south through Portland, 14 miles, and Martin's Ferry to Bellaire, O., a total distance of 26 miles. This branch will give the company a connection with the Wheeling Bridge & Terminal System in Martin's Ferry, and also with a number of towns and furnaces, iron works and other manufactories from which a heavy traffic is expected.

Wilkesbarre & Western.—J. I. Higbee, of Watsontown, Pa., who has been awarded the contract for the extension from Watsontown to a connection with the Bloomsburg & Sullivan road at Forks, Columbia County, Pa., has begun the grading, and has 125 men at work. The extension is 32 miles long, and it is expected to have 10 miles of track laid before Jan. 1. About four miles will be laid in November. There is one Howe truss bridge 200 ft. long across Big Fishing Creek, in Columbia County.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—Mr. George C. Magoun, Chairman of the Board of Directors, repeated last week what has been said several times recently by Atchison officers, that the Atchison does not contemplate building any new road. The reports of Atlantic & Pacific surveyors locating lines, notably into the Texas Pan Handle, probably arise from the fact that the Land Department of the Atlantic & Pacific has some surveying to do in connection with its land-grant claim. Since last June 51 railroad schemes have been presented to the Atchison Company, but there is not the slightest idea of building upon any of the routes suggested. Heretofore the Colorado Midland has been a local road, but self-sustaining. Colorado is one of the few sections of the United States where railroads are able to maintain reasonable rates unaffected by water competition. The crop of Colorado is not dependent upon the fall of rain or the flight of the chinz bug. Mining in that country has been reduced almost to a system like manufacturing in New England, and is not so largely a speculative business as a few years ago. The increase in the price of silver enables producers to work up great masses of low grade ores upon the dumps, furnishing business to the smelters and the railroads. It also makes possible the operation of mines heretofore idle. We could not see otherwise than that this local traffic would increase, and upon a basis of remunerative rates. The Colorado Midland runs through the richest mineral region on the globe. The Union Pacific was built north of this region and the Atlantic & Pacific south of it. Railroad mining traffic has features akin to the "milling in transit" system in the Northwest. The railroad controlling the transportation of ores to the smelting works at Denver and Pueblo will have the control of the traffic passing eastward originating from this

business, as well as a very good hold upon the supplies moving westward for these smelting companies. The control of this mineral traffic in Colorado and the strategic position in the transcontinental business influenced our decision in the purchase of the Colorado Midland. Its stock represented a cash cost to its owners of about $32.50 per share. We could not have secured the line for less than we paid, and I think that time will but further demonstrate the wisdom of the purchase. It was to a certain extent a protective measure; but the line was self-supporting, of local promise for the future, and added business to our lines, which will now be increased instead of lost. In no way should the road be a burden to us; but the full measure of its benefit will not be shown in its own earnings. It yielded the Atchison $150,000 profit on interchanged traffic last year, and will yield more hereafter.

The gross earnings, operating expenses (exclusive of taxes and rentals), and net earnings of the company, for the month of September, 1890, were as below:

	Gross earn.	Oper. expen.	Net earn.	Oper. mileage.
Roads owned and controlled	$2,989,205	$1,953,909	$1,035,296	6,527
Roads jointly owned with other Co.; Atchison Company's one-half	148,344	147,965	379	582
Total	$3,137,549	$2,101,874	$1,035,675	7,109
St. Louis & San Francisco:				
Roads owned and controlled	$625,931	$333,772	$292,159	1,329
Roads jointly owned with Atchison; 'Frisco Co.'s one-half	144,681	139,535	5,146	526
Total	$770,612	$473,307	$297,305	1,855
Aggregate—both systems	$3,908,161	$2,575,181	$1,332,979	8,964

The comparative statement for all lines is as below:

			Per Mile.		
Atchison System:	Gross earn.	Net earn.	Gross earn.	Net earn.	mileage.
September, 1890	$3,137,549	$1,035,675	$441	$145	7,109
September, 1889.	2,631,550	977,725	378	137	7,111
Increase	$445,999	$57,950	$62	$8	dec. 2
'Frisco System:					
September, 1890.	$770,612	$297,304	$415	$160	1,855
September, 1889.	690,101	294,053	372	159	1,855
Increase	$80,211	$3,251	$43	$1	
General System:					
September, 1890.	$3,908,161	$1,332,979	$435	$148	8,964
September, 1889.	3,381,950	1,271,778	377	142	8,967
Increase—Sept., 1890	$526,211	$61,201	$58	$6	

Baltimore & Ohio.—The annual report, which is to be submitted to the stockholders at the general meeting next week, shows that after the payment of all expenses, including a large expenditure for permanent improvements, charged to operating expenses, all the fixed charges, dividends on the preferred stocks and dividends on the Washington branch stock and the reduction of the bonded debt by nearly $500,000, there is a net balance of about $1,400,000. The earnings for October were as follows: On all lines east of the Ohio River—Earnings, $1,732,585, a decrease of $11,769 as compared with the same month of last year; expenses, $1,061,069; increase, $73,736; net decrease, $85,505. On the lines west of the Ohio—Earnings, $513,604, an increase of $5,476; expenses, $401,000, an increase of $51,116; net decrease, $45,640. The summary of the entire system, east and west of the Ohio River, shows the earnings to have been $2,246,189, a decrease of $6,293; expenses, $1,462,069, an increase of $124,852; net decrease, $131,145.

Catasauqua & Fogelsville.—The Philadelphia & Reading Co. has just secured control of this road, which extends from Catasauqua, Lehigh County, to Rittenhouse Gap, Berks County, Pa., a distance of 20 miles, with branches which increase the mileage to a total of 31. The road is tributary to the East Pennsylvania branch of the Philadelphia & Reading, which it crosses at Alburtis. It will give the Reading road direct access to a number of blast furnaces controlled by the Crane Iron Co. and the Thomas Iron Co.

Central Vermont.—The annual report of the company for the year ending June 30 shows gross earnings of $5,245,135, an increase of $464,223; net earnings of $1,609,107; increase, $186,929. The net revenue has been applied as follows. Expenditures over ordinary working expenses, $204,000; interest on bonds, $357,752; taxes, $97,586; rentals of leased lines, $858,026; interest paid, $86,676; balance, $5,066.

Chicago & Eastern Illinois.—There is a revival of the rumor that the Cleveland, Cincinnati, St. Louis & Chicago is negotiating for the purchase of this road. There are many reasons why the acquisition of a portion of the road would materially benefit the "Big Four." There is a belief that the greater proportion of its mileage would not be so desirable. If the line from Chicago to Danville could be acquired separately the rumor would find more credence, as that part of it would be of great advantage, and would allow the trains of the Chicago division, formerly the Kankakee line, to abandon the use of the Illinois Central tracks from Kankakee to Chicago, and make the line from St. Anne to Chicago about seven miles shorter. It would also give the Vanderbilt lines an entrance into the Polk street station at Chicago, in which the Chicago & Eastern Illinois is a large owner. The Michigan Central could also utilize the entrance, at least for freight purposes, from Kensington, 14 miles out. This arrangement would also admit of the establishment of a Chicago-St. Louis line, an arrangement recently announced as being contemplated by the two roads jointly. The formation of a close traffic agreement by the two lines is more likely to be effected than is a sale of any part of the line.

Chicago, St. Paul, Minneapolis & Omaha.—The land grant case of the Government vs. the Sioux City & St. Paul Railroad has been decided in favor of the government by Judge Shiras at Sioux City. The case involves 22,000 acres of land, part of a grant to the state to build a road from Sioux City to the state line. The railroad company only built as far as Lemars and used the Illinois Central from there to Sioux City, but claimed all the land. The court holds that the company is entitled to the same proportion of the grant as it built miles of road and no more. The attorneys for the government and the settlers claim that this will give them all the land petitioned for, while the company claims that it will be able to hold part of it. This question will probably have to be argued again.

Lackawanna & Southwestern.—The company has resumed the running of trains on the narrow gauge Olean division between Olean and Boliver, N. Y., 18 miles. There does not seem to be any probability of the company resuming traffic on the balance of the division to Angelica, a distance of 22 miles.

Manhattan (Elevated).—The gross earnings for the last year were $9,507,194, and the operating expenses, including taxes, were $5,266,365. After the payment of fixed charges and dividends the surplus earnings were $1,006,526. The passengers carried on the several lines were as follows: Second avenue line, 33,479,216; Third avenue line, 73,258,192; Sixth avenue line, 62,907,323; Ninth avenue line, 18,559,146; all lines, 188,203,877. The total number of passengers carried since the opening of the road to Nov. 1 has been 1,408,610,621.

Middletown & Hummelstown.—A meeting of stockholders will be held in Philadelphia this week to authorize an increase of the capital stock from $100,000 to $175,000. The road extends from Hummelstown to Middletown, Pa., seven miles, and is operated by the Philadelphia & Reading. The proceeds from the sale of stock will be used for the improvement of the roadbed.

Nashville, Chattanooga & St. Louis.—At a recent meeting of the stockholders, at which 59,788 shares of stock of the 66,686 shares outstanding, were voted, it was decided to rescind the resolution adopted at a previous meeting, which authorized a 10 per cent. increase of the present capital stock of this company to the aggregate sum of $7,335,473, and that the amount of increased stock, $666,861, be offered to the stockholders at par in pro rata proportion to their present holdings.

New York Central & Hudson River.—A comparison of the earnings of the company and its leased lines for the quarter ending Sept. 30 for the last two years is given in the following table:

	1890.	1889.	Inc. or Dec.
Gross earnings	$9,061,235	$9,715,202	D. $680,967
Operating expenses	6,237,523	6,373,182	D. 135,659
Per cent. expenses to earnings	68.81	65.40	
Net earnings	$2,826,712	$3,372,020	D. $545,308
Fixed charges	2,082,000	1,978,281	I. 103,719
Profit (00.83%)	$744,712	$1,393,739 (01.56%)	D. $649,027
Dividend (01.00%)	894,283	1,341,425 (01.50%)	D. 447,142
Deficiency	$149,571	Sur. $52,314	I. $201,883

The gross earnings for October, 1890, were $3,278,919. and for October, 1889, $3,436,316, a decrease of $157,397.

Northern Pacific.—The approximate gross earnings for October, 1890, were $3,486,067, an increase of $341,559 over the earnings for the corresponding period last year. The earnings for 1890 are upon 4,917 miles, being 629 miles more than in 1889.

Savannah, Griffin & North Alabama.—The road was sold at foreclosure sale at Griffin, Ga., last week and was purchased by the Central of Georgia for $500,000. The road has been operated by the latter company for some years, and the sale was made under foreclosure of a mortgage held by the company. The road extends from Griffin to Carrollton, Ga., and is about 60 miles long.

Toledo, Findlay & Springfield.—The Cincinnati, Hamilton & Dayton is understood to have accepted its option on this road, which extends from North Baltimore to Bowling Green, O., 15 miles. The purchase price is given as $250,000 and the transfer will probably be made on Dec. 1.

Union Pacific.—President Adams' emphatic statements regarding the condition of the road and its ability to handle its traffic, and the causes of the decrease in net earnings, published during his last Western trip, have not daunted the Chicago reporters from continuing their charges. The figures given in these reports President Adams says are incorrect. He says that the Union Pacific road is now burdened with traffic that it cannot properly handle. I am aware that with all our heavy business our earnings are not showing satisfactorily. The trouble is that we are short of motive power. We have only been able to get 21 of 130 engines ordered last May. If we had the necessary equipment our earnings in October would have been fully $1,000,000 larger than they were. The company is not in the market as a borrower of money, and it has no obligations of any importance maturing in the immediate future. All the talk to the contrary emanates from Wall street, and is untrue. No new bond issue is contemplated and none has been, excepting that in connection with the Oregon Navigation purchase, which is well understood.

There is no foundation for any report that the Union Pacific-Northwestern alliance will be broken. The road has no floating debt to cause it any trouble. The construction of the Portland & Puget Sound Railroad has been provided for independently of the Union Pacific, and announcement concerning this will be made soon.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Nov. 12, 1890.

The various traffic associations are in session, and owing to the number and importance of the subjects under consideration the meetings are fully attended and are likely to occupy the entire week.

The Western Freight Association has under consideration, among other topics, the adjustment of rates on live hogs and packing-house products between Chicago and Kansas City, and divisions of through rates with the Union Pacific. The hog question has been fully discussed, but no progress made, the Alton firmly refusing to compromise on 22 cents. The outlook is, however, favorable for a satisfactory settlement of the question.

The Central Traffic Association has agreed to the restoration of rates as proposed by the Trunk Lines. The proposition is substantially as follows: To advance dressed beef to 45 cents per 100 lbs. to New York, and 47 cents to Boston, with a differential of 2 cents in favor of the Grand Trunk, the Canadian Pacific to be allowed to pay shippers one cent a mile mileage on their (shippers') cars; corn to be advanced to 22½ cents per 100 lbs.; other rates to be advanced to the basis of May 12.

The Western Passenger Association is receiving some pretty plain talk from Chairman Finley in regard to the manipulation of rates. Having secured proof that the Kansas City market was stocked with Missouri Pacific train checks which were disturbing the St. Louis rates, he made an open rate of $6.50 from Kansas City to St. Louis, a reduction of $1, and announced that he proposed to apply the same remedy to any like case of which he was furnished proofs, and would keep the open rate in force until the market was relieved of the tickets which demoralized the tariff rate. The Association has decided to take no action in regard to party rates until the U. S. Supreme Court has passed upon the question.

The Interstate Commerce Commision has modified its original order in the hog rate case by providing that the rate on live hogs from points named to Chicago shall not be greater than that on packing house products, and making the order effective Nov. 25 instead of the 15th. The roads are also in receipt of information that the Commission intended its order to apply only to Chicago.

The Rock Island is reported to have purchased at scalping offices 90,000 miles of editorial tickets issued by the Atchison and to have sent them to Chairman Finley for redemption. Under the agreement, such tickets if found on the market must be redeemed by the road which issued them, at the rate of 2½ cents per mile.

The Chicago, Milwaukee & St. Paul, the Burlington, and the Rock Island have been granted permission by the Association to make the same through rates on traffic for the Union Pacific as are made by the Northwestern. This means that the eastern connections will make such rates to Council Bluffs as added to the local Union Pacific rate will make the same through rate as made by the Northwestern. Later advices from the Union Pacific state that its first circular canceling divisions by all Missouri River gateways was issued by mistake, the restriction applying only to Omaha.

The Board of Apportionment having charge of the Southwest Missouri River competitive traffic have ordered the following additional diversions of carload freight: From the Chicago, Milwaukee & St. Paul to the Wabash, 200 cars; from the Chicago, St. Paul & Kansas City, 200 cars to the Wabash; from the Atchison, 200 cars to the Rock Island and 200 cars to the Alton. Approximate figures, covering the period since the formation of the southwestern agreement (Aug. 1) to Oct. 21, show that the percentage of tonnage (subject to the agreement) carried by the lines was as follows:

Line.	Eastbound.	Westbound.	Total.
Atchison	30.3	19.6	26.5
Alton	11.5	9.5	10.8
Burlington	15 2	20	16.9
Chic., Milwaukee & St. Paul.	8.2	8.6	8.3
Rock Island	10.1	15.3	12
Chic., St. Paul & Kansas City.	5.6	6.1	5.7
Wabash	7.5	7	7.4
Missouri Pacific	11.6	13.9	12.4

The percentages of the eastbound car load shipments at Kansas City for the week ending Nov. 7 are as follows: Alton, 12.7; Burlington, 15.3; St. Paul, 7.3; Rock Island, 8.1; Atchison, 30.2; St. Paul & Kansas City, 4.4; Wabash, 11; Missouri Pacific, 11.

The Trans-Continental Association has ordered that excess baggage to or from Pacific coast points must be charged for at 12 per cent. of lowest first-class single trip through rate per 100 lbs.; no single piece weighing more than 250 lbs. to be accepted.

Street's Stable Car Line has given notice to the roads of the withdrawal of the extra charge of 1½ cents per car mile on shipments of horses and mules in their cars.

The plan for the removal of the stock yards to Lake County, Ind., is being again aired in the press, and as noted in the *Railroad Gazette* last week, it is asserted that Armour, Swift and Morris, have purchased 4,000 acres of land at that place. It is improbable that the yards will be removed at present, and many well-informed persons regard the whole report as designed to influence the real estate market.

The Joint Rate Committee has issued a notice to the effect that inasmuch as there is a 2 per cent. deduction for shrinkage on dressed beef shipments west of Chicago and the Mississippi River, the inspectors be instructed to add 2 per cent. to the western roads' weights, on the theory that there has previously been a 2 per cent reduction.

Traffic Notes.

Every now and then the Trunk Line Association abolishes the payment of commissions on passenger business. The action never amounts to anything, and every one goes on paying the commissions with just as much serenity as before. The passenger men at the Trunk Line meeting yesterday held a sort of supplementary session and went through the motions of abolishing the commission again.—*New York Herald*, Nov. 7.

The movement of freight from Buffalo to New York by canal this season has been light, the slips at Buffalo having been crowded with empty boats for weeks at a time. The stock of grain in New York at the present time is low as compared with previous years.

There is a serious blockade of grain at Milwaukee, loaded cars having come in so rapidly that they cannot be handled.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Nov. 8, amounted to 66,634 tons, against 69,353 tons during the preceding week, a decrease of 2,719 tons, and against 65,579 tons during the corresponding week of 1889, an increase of 1,055 tons. The proportions carried by each road were:

	W'k to Nov. 8.		W'k to Nov. 1.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	8,317	12.5	8,344	12.1
Wabash	2,873	4.3	3,512	5.0
Lake Shore & Michigan South.	10,504	15.8	10,474	15.1
Pitts., Ft. Wayne & Chicago	6,989	10.5	6,315	9.2
Chicago, St. Louis & Pitts.	11,252	16.9	12,592	18.2
Baltimore & Ohio	3,103	4.7	3,486	5.1
Chicago & Grand Trunk	9,293	13.9	8,289	12.0
New York, Chic. & St. Louis	8,289	12.4	8,155	11.8
Chicago & Erie	6,014	9.0	7,970	11.5
Total	66,634	100.0	69,353	100.0

Of the above shipments 957 tons were flour, 27,365 tons grain, 6,151 tons millstuffs, 1,851 tons cured meats, 1,760 tons lard, 8,309 tons dressed beef, 1,183 tons butter, 1,801 tons hides, 159 tons wool, and 8,142 tons lumber. The two Vanderbilt lines together carried 40.7 per cent., while the two Pennsylvania lines carried 27.4 per cent. During the week the lake lines carried 54,781 tons, against 55,154 tons during the preceding week. Of the shipments 4,937 tons were flour and 44,832 tons grain.